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DEPARTMENT OF AGRICULTURE AND FISHERIES
FOR SCOTLAND

Marine Research
1960 No. 3

The Scottish Seine Net Fishery 1921–1957

By A. RITCHIE, O.B.E., B.Sc., Ph.D., F.R.S.E.

EDINBURGH: HER MAJESTY'S STATIONERY OFFICE

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CONTENTS

	Page
Introduction	3
Regulations Pertaining to the Seine-net Fishery	3
Regulations in extra-territorial waters	3
Regulations pertaining to territorial waters	4
Basic Data	5
Development of the Fishery	5
I. General	5
(a) Pre-war period	6
(b) War-time development	8
(c) Post-war development	8
II. Sector Fisheries	12
(a) Moray Firth	12
(b) East Coast Bight	14
(c) South-East Coast	15
(d) Shetland	15
(e) West Coast	16
Species	17
I. Principal species and their relative importance to the Scottish fishery	17
II. General course of landings of principal species	18
(a) Cod	18
(b) Haddock	18
(c) Whiting	18
(d) Hake	20
(e) Plaice	20
(f) Lemon Sole	20
III. Species in relation to Sector and District fisheries	21
(a) Moray Firth	21
(b) East Coast Bight	23
(c) South-East Coast	23
(d) Shetland	24
(e) West Coast	24
Fishing Areas and Coastal Distribution of Landings in 1954 and 1955	25
I. Definition and relative importance of Fishing Areas	25
II. Area fishing grounds and importance to marketing centres	30
Seasonal Course of the Fishery	33
I. General	33
II. Area Fisheries	35
Importance of Seining Relative to other Demersal Methods	38
Note on the Fishery for the Years 1956 and 1957	40
Summary	41
References	42
Appendix I: District Fisheries	43
Appendix II: Tables I-XVII	54

The functions of the Scottish Home Department relating to fisheries were transferred on 1st April, 1960 to the Departme of Agriculture for Scotland, which will in future be known as the Department of Agriculture and Fisheries for Scotlan

The Scottish Seine Net Fishery, 1921–1957

INTRODUCTION

Next to the Otter Trawl the Danish seine-net is the most important instrument in use today by Scottish fishermen for the capture of demersal fish. While trawl fishing is prosecuted from a limited number of ports seining covers an extensive part of the Scottish coast, in many centres of which it constitutes the main source of revenue to fishermen.

In 1928 Bowman published an interesting and valuable account of the fishery as it was then conducted in the Moray Firth. The present report covers a wider range of events, however, and relates not only to the Moray Firth, but to the Scottish coast as a whole, from Eyemouth to Shetland Fishery Districts on the east, and Ayr to Stornoway on the west.

REGULATIONS PERTAINING TO THE SEINE-NET FISHERY

Fishing by Danish seine-net is permitted within the territorial zone adjacent to specified sectors of the Scottish coast. The main fishery, however, is located in extra-territorial waters where its prosecution is governed by regulations now internationally agreed; these concern chiefly the sizes of meshes to be used in nets, and the minimum sizes of fish that may be retained on board a vessel, landed, or exposed for sale.

Regulations in Extra-territorial Waters

The principle of mesh size as an instrument of conservation of fish stocks was recognised by the late Fishery Board for Scotland early in the present century, by its application to flounder- and seine-net fishing in the Firth of Forth and other territorial areas along the Scottish coast. It was not until 1933, however, that regulations pertaining to mesh size and minimum marketable sizes of fish were first introduced by the United Kingdom to fishing outside territorial waters—this was effected under the provisions of the Sea Fishing Industry Act of that year.

In accordance with the 1933 regulations no fishing boat registered in the United Kingdom was allowed to carry any trawl, seine or other net for the purpose of catching fish, which had a bag, pocket or codend with meshes smaller than that represented by 21 to 24 rows to the yard, according to certain prescribed conditions of the net.

Revisions of the regulations relating to mesh and minimum fish sizes have been made from time to time, and so far as the seine-net is concerned the Sea Fishing Industry (Fishing Nets) Order 1938, made under the Sea Fishing Industry Acts 1933 and 1938, prohibited fishing boats from using nets in any part of which the meshes were smaller "than is represented by 26 rows or rounds to the yard when the net is in any condition whatsoever". At the same time, revision of fish sizes was made under the Sea Fishing Industry (Immature Sea Fish) Order 1938.

During the war it was considered that some of the undersized fish retained by regulation nets would be of value as food and, as a measure of help in meeting the nation's requirements in that respect, the Immature Sea Fish Order of 1938 was replaced by regulations which provided for a reduction in the minimum marketable sizes of fish.

At an International Conference in 1946 of representatives of countries concerned with fishing in the North Sea and other waters, agreement was reached providing for further revision of regulations pertaining to both mesh and fish size and their application internationally. So far as the United Kingdom is con-

cerned, the agreed minimum size limits for fish are incorporated in the Sea Fishing Industry (Immatur Sea Fish) Order 1948, which came into force on 1st August that year. They are as follows:

Species	Lengths
Cod, hake, turbot, brill . .	12 in.
Witch	11½ „
Haddock	11 „
Lemon sole, plaice, megrim .	10 „
Sole	9½ „
Dab, whiting	8 „

The above Order continues to operate except so far as under the Sea Fishing Industry (Immatur Sea Fish) Amendment Order 1954, the minimum size of whiting which may be landed or sold in Gre Britain was increased to 10 in. as from 1st July 1954.

The Fishing Nets Order of 1938 remained in operation during the war years, but enforcement becam impracticable owing to the absence on service of fishery protection vessels. Enforcement was reimpose after hostilities ceased, however, and the Order continued to be the statutory instrument of mesh regul tion pending implementation of the 1946 Convention.

The minimum size of mesh laid down by the Convention, for both trawl and seine nets in the Nort Sea and adjacent waters, was such "that when the mesh is stretched diagonally lengthwise of the net flat gauge of 80 mm broad and 2 mm thick shall pass through it easily when the net is wet".

Scientific evidence obtained from comparative fishing experiments conducted by the Marin Laboratory of the Scottish Home Department (Lucas, Ritchie, Parrish, Pope, 1954) and confirmed b experiments conducted by the Fisheries Laboratory of the Ministry of Agriculture and Fisheries (Grahar 1954) demonstrated, however, that there is greater selectivity in the seine net than in the trawl of simil mesh size as ordinarily used. As the result of these findings amendment of the mesh sizes was agre internationally in November 1953. For the North Sea and adjacent waters the amended size for t seine net requires the use of a gauge 70 mm broad instead of 80 mm. This was incorporated in T Sea-Fishing Industry (Fishing Nets) Order 1954 which came into force on 5th April 1954.

Regulations Pertaining to Territorial Waters

Section 4 of the Sea Fisheries (Scot.) Amendment Act 1885 prohibits within exclusive fishery lim off the coast of Scotland "any method of fishing deemed to be injurious to any other kind of sea-fishing A bye-law made under the Act in 1898 (Bye-Law No. 17) made illegal in the above areas the use " trailing or dragging along the bottom of the sea, any net (including a seine or circle net) or other instr ment for the capture of sea fish other than herrings, sprats, sparling and shell fish".

In response to petitions by fishermen modifications of the above regulation have been made fr time to time, and the use of "a seine net or flounder net with a bag" is at present authorised, subject certain reservations, in the following areas:

East Coast

(a) Shetland Islands.
(b) Rattray Head, Aberdeenshire, to Red Head, Angus.
(c) Red Head, Angus, to Babbet Ness, Fife, excluding waters to the west of a line joining Budd Ness and Kinkell Ness.
(d) Firth of Forth—east of a line joining Kincraig Point to Inchkeith Lighthouse and thence West Pier Light, Leith.

West Coast

(a) Firth of Clyde—within three miles of low water mark inside a straight line from Corsewall Po to Mull of Kintyre.
(b) Luce Bay—during the period 1st September to 28th February within the waters of Luce B (Wigtownshire) inside or northwards of a straight line drawn from Mull of Galloway to Burr Head.

Between Rattray Head and Red Head on the east coast, and in the Firth of Clyde and Luce Bay, ishing is confined to boats up to 40 ft in length, but elsewhere the maximum specified length is 50 ft.

In Shetland, in the permissible area of the Firth of Forth, and in the Firth of Clyde fishermen are ermitted to use the international size of cod-end mesh for seine viz. 70 mm. Elsewhere, however, in rder to protect juvenile plaice, the size is such that it allows the passage of a square gauge of 2 inches easured along each side (equivalent to about 100 mm when stretched).

The Sea Fishing Industry (Immature Sea Fish) Orders of 1948 and 1954 apply equally to the bye-aw areas and to other fishing fields.

BASIC DATA

The data used in the preparation of this report cover all the Fishery Districts, except Orkney where ery little development has taken place in seining up to the present. The following are the Districts:

Eyemouth
Leith
Anstruther
Arbroath
Aberdeen (including Stonehaven)
Peterhead
Fraserburgh
Macduff
Buckie
Lossiemouth
Helmsdale (now administered from Wick)
Wick
Shetland
Stornoway (including Barra)
Loch Broom
Kyle
Oban
Tarbert (now administered from Campbeltown)
Campbeltown
Ayr

Vith regard to Macduff and Wick seining is a major occupation of the fishermen at the ports of Whitehills nd Macduff in the first, and Lybster, Wick and Thurso-Scrabster in the second, and statistics of landings ere obtained separately for each of these.

The data to which it has been possible to direct particular attention cover the years 1935 to 1955; ey give details of annual and monthly landings at the respective Districts and include information lative to:

(a) numbers of catches landed ('arrivals') and the numbers of days absence from port.
(b) total landings and their values.
(c) landings of principal species and their values.

It was not possible before 1954 to allocate individual catches to their grounds of origin, but in that d the following year an improvement was effected whereby in the course of collection the data were lated to nine widely defined areas of the sea. This refinement has permitted useful discussion later in e report (p. 25) of the annual and seasonal disposition of the fleets and their landings, and has disclosed me important facts relating to the species which play an important role in the success of the fishery.

In the preparation of the paper the author acknowledges the valuable help in understanding events plicit in the data which was obtained from regular consultation of the Reports submitted depart-entally by the District Fishery Officers. The Annual Reports of the late Fishery Board for Scotland d the Scottish Home Department also constitute an important source of information.

DEVELOPMENT OF THE FISHERY

General

Table I, from which Fig. 1 is constructed, shows for each year from 1921 to 1955 the total weight d value of white fish landed by seine-net boats in Scotland.

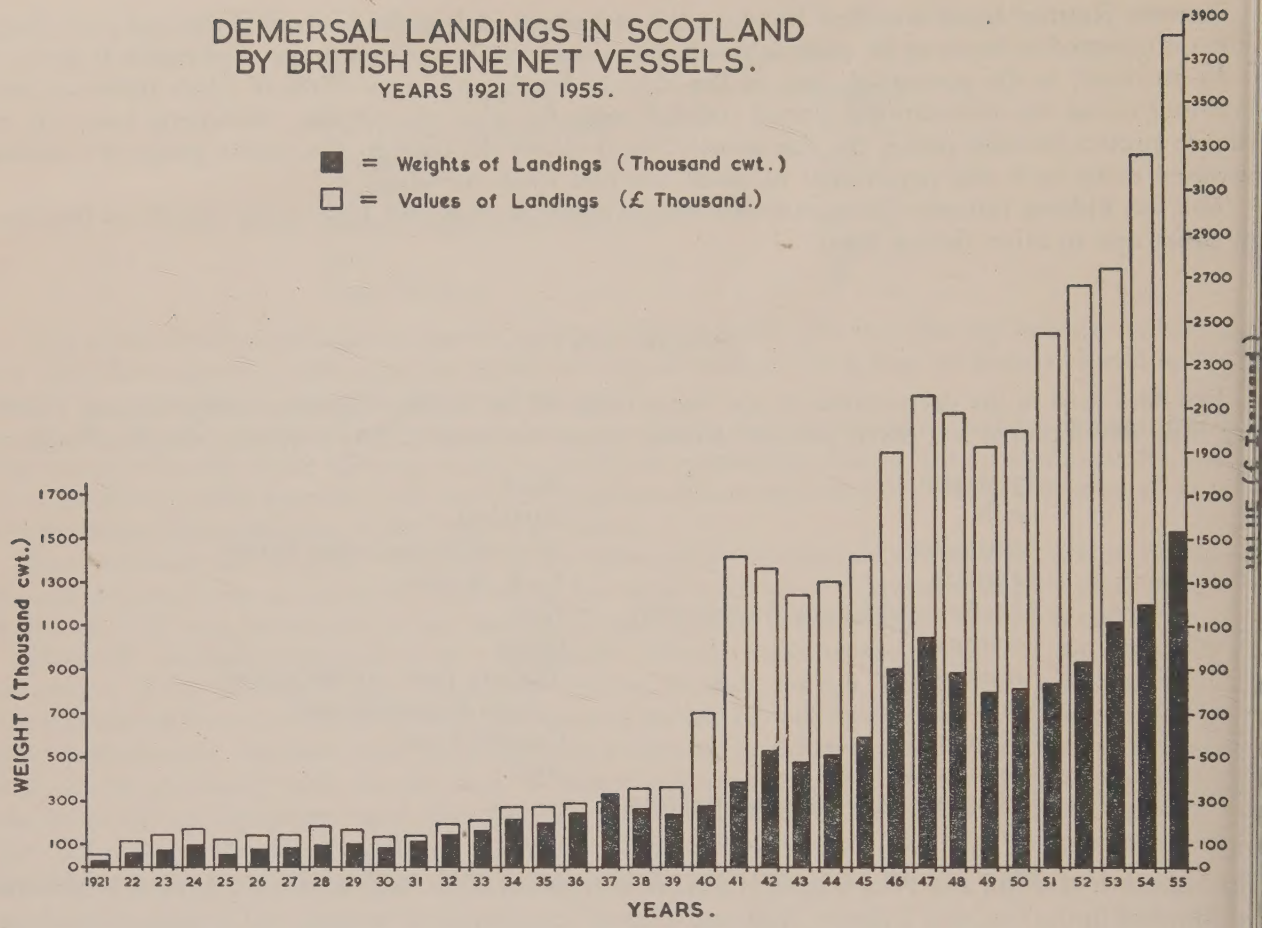

Fig. 1

(a) *Pre-war Period*

The Danish seine net or "snurrevad", which was developed and perfected in Denmark, was introduc into Scotland in 1921, in which year Danish crews using the net had been making profitable landings English ports. At that time the herring fishery, both in Scotland and England, was passing through period of trial and stress, and the success attendant on the Danish boats attracted some fishermen to t possibilities of using the net in local waters.

A number of boats were accordingly fitted out for seining during that year. The majority from Scotla at first operated in the Moray Firth using Buckie as a base, but they were accompanied for a time b few English boats which landed their catches at Aberdeen. So far as the English crews are concern the results were generally disappointing, but Moray Firth crews fared somewhat better, owing, as w reported at the time, to better knowledge of the grounds. The total landings in 1921 amounted to 15,2 cwt valued at £38,084.

The depressed state of the herring industry continued for some considerable time after 1921; a result more fishermen turned to seining and by 1923 the landings increased to 61,532 cwt valued £142,888. At this time boats operated in the Moray Firth chiefly during the early months of the ye Thereafter a few reverted to herring fishing in the summer months, or went round to the west co grounds to continue seining there; during the remainder of the year, however, a large number took p in seining on the North Sea Banks. When in the Moray Firth boats based their operations on Lossiemou Macduff and Fraserburgh as well as Buckie, while those working farther out to sea landed their fish Aberdeen.

During the early history of its development in Scotland, seine-net fishing was conducted mainly by team drifters, and in 1923 approximately 74% of the total landings were attributable to that class of essel as against 26% to motor boats. The cost, however, of running and maintaining steam drifters was igh, and while a number of crews made fair earnings others found it difficult to make ends meet. It eemed doubtful, at the time, whether seine netting would ever become established as an integral part f the catching side of the fishing industry, and it was a matter for speculation whether operations would ave continued even thus far had success meantime attended the herring fishing.

Nevertheless, despite the uncertainty of the position, more herring fishermen took up seining in 1924. hat year, however, was probably made more important as marking a step towards the permanent stablishment of the fishery by the fact that a number of Arbroath District fishermen, whose principal ccupation had hitherto been lining, changed over to the new method and fitted out as many as forty-five oats with the net. During the year they landed a total of 9,876 cwt, which was slightly less than one-inth of the total for all fishery districts along the Scottish coast.

The onset of improved conditions in 1925, both at the home ports and East Anglia, encouraged team-drifter fishermen to return to the herring fishing, and the proportion of the seine-net catch for the ear attributable to that class of vessel fell to approximately 50%. From that time onward the continued evelopment and extension of the fishery became closely associated with the development and improve-ient of a class of motor boat better suited to seining by virtue of size and running costs. As a consequence, ie yearly contribution by steam vessels continued to fall; it amounted to 24·2% in 1930 and reached as ow as 0·2% in 1938.

During the early stages of development of the fishery Aberdeen was the principal port of landing, nd 36,771 cwt landed there in 1924 were equivalent to 42·2% of the total for both east and west coasts. ossiemouth District, with Lossiemouth as its chief port, came next, but with a substantially lower total f 18,902 cwt. The reduced employment of the steam drifter, however, effected a rapid change in the istribution of landings whereby Aberdeen lost its position of pre-eminence, and for a period prior to 939 seine-net activity at that port was confined mainly to the operations of small motor boats fishing earby grounds.

Meanwhile developments at Lossiemouth continued apace, and in 1928, by virtue of an aggregate nding of 96,000 cwt, the port and district became the leading seine-net centre in Scotland, a position consolidated and improved during each succeeding year until the outbreak of war in 1939. Activity n the district reached a pre-war peak in 1937 when landings of 147,765 cwt and a value of £127,158 ccounted respectively for 45% and 39% of the totals for all districts.

Although seine-net fishing had been prosecuted from Buckie and Fraserburgh since its early intro-uction to Scotland the majority of the fishermen at these ports remained true to tradition as herring shers, and up to the outbreak of war seining was regarded as an ancillary source of revenue to be ractised between the seasons of herring fishing.

The fishermen of Macduff Fishery District, on the other hand, rapidly adopted the new method as eir main occupation throughout the year, and at the port of Macduff itself, and at Whitehills, fleets of mall but efficient boats were rapidly acquired for the purpose.

Of the remaining Moray Firth Districts, seining had also assumed prime importance to the fishermen f the port of Wick, while it had taken the place of lining at Lybster and the adjacent district of Helmsdale. s adoption by Wick fishermen was one of the direct results of the failure of the port to retrieve the osition it had held before the first world war, as one of the principal centres of the herring industry. he initial landings were made by boats from other Districts but the port soon acquired a fleet of its wn, and further additions were anticipated when hostilities broke out in 1939.

Of the Fishery Districts situated along the East Scottish Coast Bight, that is between Rattray Head nd Fife Ness, boats from Peterhead as well as Aberdeen and Arbroath Districts practised Danish seine-et fishing soon after its introduction to Scotland; in each case, however, the fleets consisted generally f small boats, and were thus permitted by law to fish within territorial waters. In this respect Arbroath as the most active centre, owing mainly to the operations of fishermen who fished intensively in St. ndrews Bay and grounds adjacent to it.

Fishing for flat-fish by means of the flounder seine was introduced to the Firth of Forth towards the

end of the last century by fishermen on its south coast. The net was used at first from sail boats, the from motor boats, and was replaced later by the Danish seine-net. Thereupon that method rapid became the established source of revenue to fishermen, particularly of Port Seton, who fished groun in the firth during all but the early months of the year when the majority were normally engaged o herring fishing.

With regard to the islands to the north of Scotland, in response to a petition from Shetland fisherm the late Fishery Board for Scotland passed a byelaw in 1926 authorising seining within certain territori waters in the area; the fishery made little progress, however, until war conditions compelled mo fishermen to take it up in preference to lining. As already mentioned, very little fishing takes place i Orkney.

East coast fishermen, while fishing in the Clyde area, landed their catches at Ayr; that Distric however, gradually acquired a fleet of its own and the operations of local and stranger crews adde considerably to its progress as a seine-net centre. Elsewhere on the west coast seining acquired litt importance before the war, and in 1938 landings for the coast as a whole amounted to only 15% of th Scottish total.

As will be observed from Table I the aggregate for 1937 constituted a pre-war peak of 323,908 cw or 21 times the 1921 total; the much smaller weight in the following year, however, yielded a record i value of £347,828, which is 9·2 times that of 1921.

(b) *War-Time Development*

It was shown in the Scottish Home Department Report for the period 1939-1948 that over 50% o active fishermen from Scottish creeks and ports were called to service during the late war, while 27% of the motor-boat fleet of 30 foot keel and upwards (and a much larger percentage of the bigger boats were requisitioned, chiefly for Admiralty purposes.

War-time conditions rapidly affected the prosecution of all methods of fishing, and landings o herring became concentrated on a limited number of ports; such centres as Shetland, Anstruther an Eyemouth lost much of their pre-war importance, for the time being at any rate. The fishermen fro these areas not called to the forces had, therefore, to seek other ways of earning a livelihood, and whil a number went over to trawling others turned in the direction of seining.

The circumstances which thus arose, including legal changes in the minimum marketable sizes o fish and the assurances embodied in price control, encouraged older men also to take up seining, whil the numbers becoming available for the fishery were further augmented by small- and hand-line fishermen who found difficulties in the baiting of lines. The temporary loss by the transference to war service o both men and boats was thus partially overcome, and during the war years the fishery was not only maintained at a high level at pre-war centres, but increased in importance at Shetland, Fraserburgh Peterhead, Anstruther and Eyemouth, where it had previously constituted only a minor part of the fishery economy. War-time conditions also offered a stimulus to production on the west coast and landings increased, particularly at Ayr and Campbeltown.

In 1945 the total landings for both east and west coasts amounted to 587,359 cwt valued at £1,430,319 which is approximately 2·3 times the 1938 weight and 4·1 times the value. Almost 91% of the landings were delivered at ports on the east coast.

(c) *Post-war Development*

With the return of men and boats after the war the fishery was prosecuted with even greater intensity than before and in 1946 landings reached 910,078 cwt, thus exceeding the previous year's total by 55%.

In addition to boats returned from the services, the fleet was augmented by the construction of new boats and by the purchase of Admiralty built vessels surplus to naval requirements. Construction for private ownership, restricted in 1946, was speeded up in later years, and in addition to seining a large number of the new boats were fitted for drift-net fishing.

Of the total of 910 motor boats of 30 ft and upwards belonging to the Scottish Fishery Districts in 1938, including those engaged in seining, 70% were within the size range of 30 ft to 45 ft, while the remaining 30% were over 45 ft. The tendency during the post-war period, however, for the employment

a larger class of vessel is demonstrated in the Scottish Home Department Report for 1955, which states at the fleet mainly engaged in seining that year numbered 653 vessels, of which 45% were up to 50 ft length, while 29% were between 50 ft and 60 ft and 26% over 60 ft.

Financial aid from Government sources has played a leading part in post-war development and has couraged the different centres, including Lossiemouth, to maintain and increase their pre-war activities. utstanding in this respect have been the advances made at Peterhead, Fraserburgh, Buckie and Wick, e last being occasioned not only by increased activity at the port of Wick itself, but also by the rapidly creased concentration of operations on Thurso-Scrabster. The fishery is likewise established as an ential factor in the economy of Shetland, while on the west coast the pioneering spirit of east coast hermen has not only led to increased production in the Clyde area, but has been instrumental in ening up important centres farther north, particularly in the Oban and Loch Broom Districts.

Production in 1947 reached a level not hitherto experienced when 1,056,124 cwt were landed from ,187 catches to give a total value of £2,173,469.

In the next two years prolonged periods of adverse weather frequently interrupted fishing operations d in each year a reduction took place in the number of catches landed; this, together with an apparent ling off in supply, brought about a decline of 15% in yield in the first year and a further 12% in the ond. The improvement which followed in 1950 was small but a steady market was helpful to fishermen d the total revenue for the year was short of the 1947 level by only 11%.

As greater effort continued to be applied to the fishery the number of landings also increased and tween 1951 and 1955 they were on the average 58% greater than before the war, while the quantity fish landed per unit catch increased to nearly three times. In 1953 total production exceeded the 1947 ak and by two further substantial increments it reached 1,529,562 cwt in 1955. For the five years the rage was 1,131,261 cwt or more than four times that of 1935 to 1938.

The Table below shows for four periods between 1935 and 1955 the average numbers of catches ded annually, and the respective weights of fish landed, both total and per 100 catches. The table tomises the stage of development reached by the fishery immediately before the war, its advance ring the war, and the results attained since then with its adoption by increasing numbers of fishermen ng more powerfully equipped vessels which cover a wider area of sea.

Years	Arrivals (catches) Annual Averages	Total Landings		Total Values	
		Annual Averages	Averages per 100 arrivals	Annual Averages	Averages per 100 arrivals
	No.	cwt	cwt	£	£
1935-1938	46,848	252,972	540	307,808	657
1939-1945	52,781	427,046	809	1,126,528	2,132
1946-1950	66,659	819,598	1,339	2,024,279	3,036
1951-1955	74,106	1,131,261	1,526	2,988,623	4,033

Success in seine-net fishing is largely dependent on the degree of abundance on the grounds of fish the proper quality and the ability of the fleets to catch them. In the latter respect a wide variety of tors operate in an important way. It will be convenient to consider these briefly as a preliminary to mination of the progress of the fishery over a period of years along different Sectors of the coast. e District fisheries are considered in Appendix 1 to the report.

The numerical strength and size composition of the respective fleets are determined, not only by the ilable manpower but also by the size and navigability of the harbours. The acquisition after the war large boats, employed wholly or partly on seining, is a development primarily associated with the re adequate facilities available at the larger fishing centres such as Lossiemouth, Fraserburgh and erhead where, in the past, harbour construction has progressed so as to meet the anticipated require- nts of large and expanding herring fleets.

The presence of a healthy plaice population on the grounds adjacent to Aberdeen is an attraction small seine-net boats; since the war, however, the facilities available at the port for the handling of whi fish and its more direct connection with south markets have also encouraged extensive landings by larg boats fishing the more distant grounds.

At the smaller centres, however, such as Helmsdale and Lybster in the Moray Firth, the history harbour development is closely related to the prosecution in the last century of inshore herring fishi by means of small open or half-decked boats. Accommodation at these ports remains, therefore, a limiti factor to the number and size of boats that can be adequately employed at seining.

In addition to accommodation an important aspect of the suitability of harbours is their accessibil to the fishing grounds. On the grounds themselves productivity is influenced by the types of net us and the extent of warp employed in operating them; weather is a further conditioning factor in success fishing.

With regard to gear, Glanville (1953) and Dickson (1959) have published interesting and instructi accounts of the construction and method of operation of the Danish seine net. The Scottish film "Fi and the Seine Net" illustrates the method, underwater and at the surface. It will suffice here, therefo to indicate only its main features. These are shown in Fig. 2.

The net consists of two walls of netting, the wings, attached above to the headrope and below to t groundrope. The wings meet at the shoulder from which the netting is directed backwards to form bag or funnel, the closed end of which retains the fish and is known as the codend. Weights are attach at intervals along the groundrope while the headrope is supported by floats likewise disposed. The net operated by two long warps attached to the fore-end of each wing by means of a wooden pole, the da leno, which also helps to maintain the wing in an upright position.

Two main types of net are used, viz. the plaice seine and the haddock seine. There are no extensi differences between them in shape and construction except that the plaice seine, which is used in shall water, is smaller in size and carries more weights on the groundrope. Present day fishing in Scotlan however, entails much greater use of the haddock seine. While this net is manufactured to type, a numb of variations appear on the market, the differences between the variations being more a question of leng of wing and depth than anything else. Fishermen do not depart far from the accepted method of operati but they sometimes have their own ideas as to refinements in construction to improve fishing, a frequently put these into practice.

There are two main methods of using the Danish seine, namely anchor fishing for flat-fish and d dragging for round-fish, of which the latter is general to Scottish fleets. The warps are divided i sections or coils each 120 fm long; equal lengths are used from each wing with the number of coils varyi according to boat size and the nature and depth of the grounds fished. Between four and thirteen co each side are used by boats fishing from Scottish ports.

On account of the construction and method of operation the grounds fished by the seine net requ to be clear of obstructions. The net therefore offers a more limited fishing field than the trawl. Th efficient use of modern depth recorders in the hands of observant fishermen has, however, gone so way to overcome this disadvantage, as it enables more intimate knowledge of the sea bottom to acquired, whereby fishermen are able to operate close to hard and rocky ground with comparative saf to gear.

As to weather, the absence of too much sea disturbance is a conditioning factor in the succes fishing and, because of the small size of many of the boats, adverse conditions may bring operati temporarily to a close. It sometimes happens, therefore, that the larger units are able to continue work while the smaller vessels are compelled to remain in port.

Interruption of fishing by inclement weather varies, of course, on different parts of the coast, and frequently a determining factor in the choice of grounds. In this connection it is the normal course certain districts for the larger units to work offshore while the smaller boats concentrate on groun nearer land; the intervention of bad weather, however, sometimes compels the larger units to leave t deeper water and join their colleagues on inshore grounds.

The location and condition of harbours not only influence the extent of interruption of fishing weather, but frequently dictate the normal duration of fishing trips. A large number of the units of

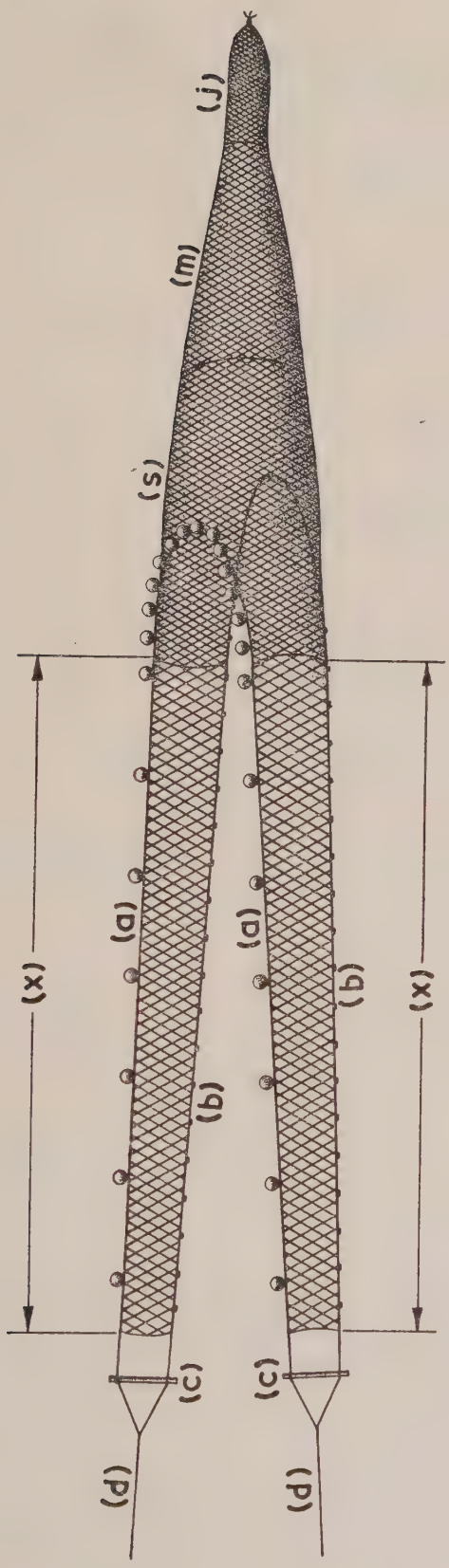

Fig. 2. Danish Seine Net general Outline

District fleets leave port in the early morning and return with their catches later in the day; the time sp in actual fishing, however, is not only related to the distance and time to and from the fishing grou but may also be affected by the periods of each tide during which the harbours are navigable.

Before the war a small number of the catches landed each year were from trips extending beyond day's absence from port, a feature which was more distinctive of Lossiemouth than any other Dist Since the war, while the normal course of daily landings has persisted throughout the coast, trip longer duration have become a more distinctive feature of the activities of the larger boats from major fishing centres.

II Sector Fisheries

The Sectors into which the Scottish coast has been divided for the purpose of examination of progress of the fishery are defined below:

Sector	Fishery Districts
(1) Moray Firth	Wick (including Lybster), Helmsdale, Lossiemouth, Buckie, Macd Fraserburgh.
(2) East Coast Bight	Peterhead, Aberdeen, Arbroath.
(3) South-east Coast	Anstruther, Eyemouth, Leith.
(4) Shetland	One District.
(5) West Coast	Kyle, Oban, Tarbert, Campbeltown, Ayr, Stornoway, Loch Broom.

Details of the respective annual catches and landings, including the average landings per 100 catc are given in Table II, which also shows the relationship of each of these three items to the respec average for the period as a whole.

Figure 3 is constructed from the Table.

The following shows the percentage proportions of arrivals and landings attributable to each Se during four specified series of years:-

Sector	1935 to 1938		1939 to 1945		1946 to 1950		1951 to 1955	
	Arrivals %	cwt %	Arrivals %	cwt %	Arrivals %	cwt %	Arrivals %	cwt %
Moray Firth . .	73·3	75·2	51·3	47·9	46·8	44·1	52·5	43·6
East Coast Bight .	14·9	11·5	17·3	18·7	18·8	21·4	12·4	19·1
South-East Coast .	7·3	4·4	19·7	18·7	15·6	12·8	12·4	10·0
Shetland . .	0·1	0·2	2·3	0·6	6·2	5·4	5·9	7·7
West Coast . .	5·0	8·7	9·4	13·9	12·6	16·3	16·8	19·6

(a) *Moray Firth*

Before the war approximately three quarters of the Scottish seine-net catches were landed in Moray Firth, and, although later development extended to coastal areas beyond the firth, the Se continued to be the chief centre of activity and production. In the period 1935 to 1955 catches aver 32,232 per year, and landings 317,768 cwt or 986 cwt per 100 catches.

In 1935 total yield amounted to 139,249 cwt or the comparatively low equivalent of 411 cwt; impr results in the next two years, however, increased unit production in 1937 to 748 cwt, while the rose to 258,920 cwt. Although this was the highest attained since the introduction of the fishery to Sector, poor demand and low market prices restricted its value to only 18% above that of 1935, respective totals being £210,372 and £248,519.

In 1938 unit production declined to 514 cwt. Total yield fell by approximately 83,000 cwt bu significant hardening of market prices maintained total value at £246,676; approximately 58% of landings were at Lossiemouth and they produced 52% of the value.

Fishing operations from the Moray Firth ports were curtailed during the second half of 1939 so t for the Sector as a whole, arrivals and landings continued on a descending scale. War-time condit

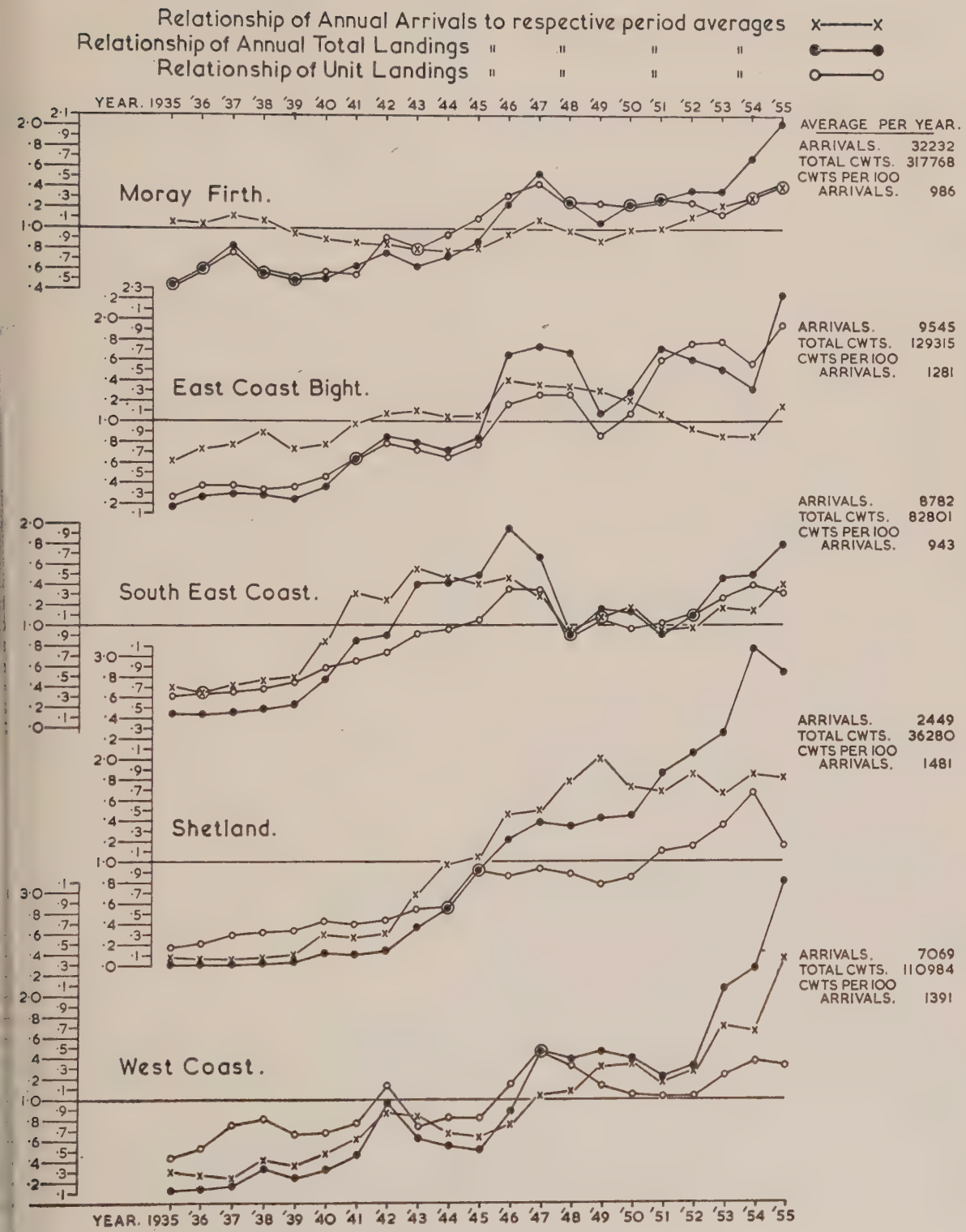
Relationship of Annual Arrivals to respective period averages
Relationship of Annual Total Landings
Relationship of Unit Landings
YEAR. 1935 '36 '37 '38 '39 '40 '41 '42 '43 '44 '45 '46 '47 '48 '49 '50 '51 '52 '53 '54 '55
Moray Firth.
AVERAGE PER YEAR.
ARRIVALS. 32232
TOTAL CWTS. 317768
CWTS PER 100 ARRIVALS. 986
East Coast Bight.
ARRIVALS. 9545
TOTAL CWTS. 129315
CWTS PER 100 ARRIVALS. 1281
South East Coast.
ARRIVALS. 8782
TOTAL CWTS. 82801
CWTS PER 100 ARRIVALS. 943
Shetland.
ARRIVALS. 2449
TOTAL CWTS. 36280
CWTS PER 100 ARRIVALS. 1481
West Coast.
ARRIVALS. 7069
TOTAL CWTS. 110984
CWTS PER 100 ARRIVALS. 1391
YEAR. 1935 '36 '37 '38 '39 '40 '41 '42 '43 '44 '45 '46 '47 '48 '49 '50 '51 '52 '53 '54 '55

Fig. 3. Annual course of sector fisheries—Years 1935–1955

varied in their impact on fishing activity at different parts of the Sector, and in each of the years 19 to 1945 total arrivals remained below the period average. Meanwhile, however, unit catches increas and except for a slight interruption in 1943 the lower fishing effort produced regular annual increa in total yield; in 1945 it reached 273,800 cwt, or 55% more than in 1938.

Despite the wartime difficulties encountered at some of its ports, Lossiemouth in particular, Sector maintained its position as the principal centre of the fishery, and accounted for just under half total landings for the whole coast.

The return to peacetime conditions in 1946, and its accompaniment of progress in the equipmen boats for their normal occupation, increased seine-net activity throughout the Sector and approxima 5,000 more catches were landed than in 1945. They yielded a weight of 394,592 cwt, thus represent an increase of 41%.

With the acquisition of more powerfully equipped vessels, the extension of the fishing grounds t wider field and good supplies of fish on the grounds, unit landings increased in 1947 to 1,402 cwt the total to 486,101 cwt: the total thus exceeded the maximum of ten years previously by almost 4 and produced a value of over £1,000,000.

Shoals were difficult to encounter in the Moray Firth in the next two years and a number of b transferred their operations to ports outside the Sector; as a result fewer catches were landed and 1949 landings fell by 41%. An improvement followed in 1950 and for the first five years of the post- period an average of 31,208 catches yielded 401,986 cwt.

Despite the fact that units of the Sector fleets continued to fish for periods at a time from west c and other ports, its production remained much greater than that of any other throughout the sec half of the post-war decade.

In 1951 a total of 32,251 catches yielded 410,621 cwt; with continued development at several of ports in the next four years they reached a total of 45,325 in 1955. This produced 644,612 cwt va at £1,686,321, of which considerably more than one-quarter of both weight and value were in res of Lossiemouth. The combined activities of Fraserburgh, Buckie and Wick accounted respectively 57% and 54%.

(b) *East Coast Bight*

The numbers of catches landed at the three districts of the East Coast Bight from 1935 to ranged from a minimum of 5,781 in the first year to a maximum of 13,403 in 1946 and averaged 9 per year. As in the Moray Firth, Sector landings were lowest in 1935 and reached a maximum in 1 the range being 19,222 cwt to 290,195 cwt; the former is equivalent to 333 cwt per 100 catches as ag 2,618 cwt for the latter.

As previously indicated, fishing from the Sector ports before the war was conducted mainly wi the territorial zone where plaice was the primary objective. Small boats were therefore the prin components of the fleets. Production did not follow precisely the sequence pertaining to the Moray F but landings were distinctly less in 1935 than in the next three years. In the four-year period they aver 29,168 cwt per year and produced a value of £35,636.

Landings showed little change in 1939 but they improved as greater attention was directed to sei and in 1942 reached a wartime peak of 108,640 cwt or 1,078 cwt per 100 arrivals; for the remai of the period the average was 99,872 cwt. The ports of Peterhead and Aberdeen provide greater fac for the development of seining than elsewhere in the Sector. The average post-war production at centres increased to nineteen and fifteen times the respective pre-war levels while in Arbroath Di the increase was limited to 4·5 times.

The number of arrivals in the Sector in 1946 was 13,403 or 34% greater than in 1945; they prod a unit average of 1,572 cwt. Whereas these declined in 1947 and 1948, unit production increased so in the three years little change occurred in total yield, which averaged 216,098 cwt per year. In 1 however, the Sector experienced the decline common to many east coast centres and the yield fell l much as 37%. The numbers of landings continued to decrease, and fell to the minimum of 7,998 in 1 meanwhile, unit production increased rapidly from 1,150 in 1949 to 2,426 cwt. These changes, how were not general to the Sector as a whole, the reduction in arrivals on the one hand being largely due

line in fishing activity at Peterhead, while the increases in unit production were associated with a ater abundance of landings at Aberdeen, by larger boats undertaking extensive trips to distant grounds. e general effect on the Sector fishery, therefore, was to maintain total production at a relatively h level of approximately 200,000 cwt per year.

A slight decline took place in 1954, but in 1955 not only was a relatively high yield at Aberdeen intained but there was a distinct recovery at Peterhead where, in addition to numerous inshore sels, the fleet included a substantial number of medium- and large-sized units operating off-shore. e value of the catch was £697,103.

(c) *South-East Coast*

From 1935 to 1955 an annual average of 8,782 catches was landed at ports of the south-east coast. ndings ranged from 9,698 cwt in 1935 to 162,653 cwt in 1946 and averaged 82,801 cwt per year or cwt per 100 arrivals.

Prior to 1939, when herring fishing was the principal occupation of Anstruther and Eyemouth ermen, little attention was directed to seining. There were indications however, that the possibilities he seine-net method were being considered by a number of Eyemouth crews. Between 1935 and 1938 vals averaged 3,427 per year and produced 11,117 cwt valued at £14,345 of which Port Seton in th District was responsible for 87%.

Wartime developments increased seining activity to over three times the pre-1939 level while yields to over eight times. The herring fishery at Anstruther was well maintained until 1942 but thereafter away, thus creating circumstances favourable to the development of seining; in this the district was ped by stranger as well as local crews. At Eyemouth, however, as the advent of war conditions brought ring fishing to a close local fishermen rapidly turned over to seining. Meanwhile the Port Seton ery was well maintained and seine-net catches were also landed at other ports of the Leith District. the seven war years Sector catches averaged 10,398 per year and landings 79,907 cwt.

Concentration on seine-net fishing by Anstruther and Eyemouth crews after the war was influenced her by the disappearance of winter herring shoals from the approaches to the Firth of Forth and the ure of that fishery to revive at Eyemouth. For the Sector as a whole 1946 was the year of highest duction when 162,653 cwt were produced by 12,722 arrivals; they yielded a value of £301,691.

After 1946 fishermen experienced reduced fish supplies sooner than their colleagues farther north by 1948 landings had fallen by one-half. From 1949 to 1952, however, a regular annual influx od to the fishing grounds and improved market prices helped considerably to maintain the economy he fishery and in the four years an annual average of 89,500 cwt yielded £237,900.

Operations of boats within the Firth of Forth generally provide fair supplies but success as a whole ow dependent largely on supplies from further afield. From 1953 to 1955 the more distant grounds ded increasingly good catches and in the last year total yield rose to 148,218 cwt, or 2,618 cwt per arrivals, which produced a maximum value of £339,529.

(d) *Shetland*

Shetland constitutes one Fishery District. From 1935 to 1955 an annual average of 2,449 seine- catches were landed there, and they yielded 36,280 cwt or 1,481 cwt per 100 arrivals.

For a long period of years the welfare of the District as a fishing centre depended largely on the ring fishing, and except for small- and hand-lining other methods occupied a minor place in the ustry. One of the chief events recorded in the history of seine-net fishing in Scotland, however, is rapid rise in importance of that method in Shetland during and since the war.

In 1938 a total of 599,791 cwt of herring was landed, while small- and hand-lines yielded 28,335 cwt white fish. The former contributed 91% of the total revenue and the latter 8%. Meanwhile, from to five boats fished by seine net within territorial waters at irregular intervals between May and ober; they landed only 629 cwt valued at £727.

The war acted with immediate and crippling effect on the herring industry and during 1940 to 5 average annual landings fell to 25,913 cwt. Small- and hand-line fishing also declined from 32,754 in 1939 to as low as 4,873 cwt in 1944. Meanwhile greater interest was being directed to seining.

It took fishermen some time, however, to accommodate themselves fully to the changed circumstan and it was not until 1943 that adequate seine-net gear was acquired. Production that year increased 12,696 cwt and continued thereafter on an ascending scale until in 1945 a total of 32,648 cwt valued £71,857 was reached.

With the gradual removal of war-time restrictions after 1945, and the return of men and boats fr the services, herring fishing was resumed with something like pre-war intensity. A total of 502,282 valued at £426,563 was landed in 1948; thereafter, however, results were less favourable, and betw 1950 and 1955 landings averaged 126,250 cwt per year, valued at £104,293. Meanwhile fishermen w not disposed to return to small- and hand-line fishing, and this method is now conducted on a m smaller scale than before the war; from 1946 to 1955 its average annual yield was 3,855 cwt as aga 24,716 cwt from 1935 to 1938.

Seining, however, continued to receive increased attention, and in 1946 the maximum fleet operat numbered 57 vessels, fifteen more than the previous year. In 1948 the total employed reached 71, dispo throughout the district creeks as follows:—Scalloway and Burra Isle 29, Lerwick 21, Whalsay Skerries 14, Yell 3, Papa Stour 2, Unst 1, Vidlin 1. The effort directed to the seine-net fishery each y is influenced by the success of the herring fishing and by local market conditions and transport: in l years fishermen helped to overcome market difficulties by conveying their catches direct to Aberd or by consigning their fish for sale at that market.

In 1946 arrivals at the district numbered 3,514 and increased thereafter to give an annual aver of some 4,200 for the period 1946 to 1955. A total of 43,533 cwt landed in 1946 represented an incr of 33% above 1945. From then onwards production advanced rapidly, until in 1953 the total was 81, cwt or 2,002 cwt per 100 arrivals: in addition to this, 19,102 cwt were conveyed by local boats to o Scottish ports. Meanwhile the herring fishing had fallen to as low as 54,900 cwt but an improven was experienced in the next two years and the total went up to 151,300 cwt in 1955. In association this more boats than usual were withdrawn from seining in the summer months, but the overall e nevertheless was well maintained. The fleet had a maximum numerical strength of seventy-two w compared with 1948, it included a higher proportion of the larger class of vessel, twenty-six being betv 50 ft and 70 ft in length and six over 70 ft. In each of the two years, fishermen were generally fortu in encountering good shoals of fish and in 1954 landings reached a peak of 111,485 cwt valued at £175, although a decrease of 9,207 cwt occurred in 1955 local revenue benefited to the extent of £82,545 landings made direct to Aberdeen.

(e) *West Coast*

Seine-net fishing by boats up to 40 ft has been permissible within territorial waters of the Firt Clyde since 1921, and seasonally in Luce Bay (Wigtownshire) since 1922. Fishing was, however, condu on a comparatively small scale until east coast fishermen visited Clyde waters with the Danish net s after its introduction to Scotland. Production in 1922 amounted only to 1,616 cwt but as the activ of east coast crews increased in later years landings advanced progressively in weight, and in 19 total of 16,569 cwt was reached. Between 1935 and 1938 landings ranged from 14,718 cwt to 38,037 Of the latter total, 74% was in respect of Ayr District while the remainder was contributed by Camp town, Tarbert and Oban.

During the war east coast fishermen found it convenient to visit west coast waters more frequ and in addition to the above centres landings were made at Mallaig in Kyle District. Total produc increased from 28,802 cwt in 1939 to 109,314 cwt in 1942, when there were 6,716 catches which gav average of 1,627 cwt per 100 catches. Ayr, which continued to be the principal centre, was respons for 53% of the catches and 65% of the landings. Except at Oban, fishing activity was well maintai throughout the remainder of the war period; results were less productive, however, and from 194 1945 they averaged 62,744 cwt or 1,146 cwt per 100 catches.

In 1946 the number of catches landed at west coast ports increased from 4,865 to 5,896 and produ 98,990 cwt, which represented an advance of 72% on the previous year's total. Fishing in that y however, was concentrated on the Firth of Clyde and adjacent waters, and the Districts of Ayr, Camp town and Tarbert accounted for 98% of the catches and 97% of the yield.

Crews from the east coast opened up Oban and Mallaig to seining in 1947 and this, together with ther expansion at Clyde ports, increased production by a further 65% to 162,893 cwt. From 1948, ich marked the establishment of Loch Broom District as a centre of fishing, to 1952, total yield ied from 130,999 cwt to 162,177 cwt, and, for the first seven years of the post-war decade the annual rage was 143,450 cwt.

It cannot be anticipated that the seine-net method will be extensively adopted by west coast crews, the near future at any rate, but the success already achieved encouraged increasing numbers of east st fishermen to base their operations on the Sector during 1953 to 1955. With the help of long periods avourable weather, the fishery was prosecuted with increased intensity from Loch Broom, Oban and r Districts and maintained at a high level elsewhere, whereby in the three years annual average yield e to 273,675 cwt. In the last year catches reached a peak of 18,060 or 5·5 times the 1938 total, while cessful results obtained throughout the year increased landings to 344,004 cwt; this was nine times 1938 yield and produced a value of £913,376.

SPECIES

Principal Species and their Relative Importance to the Scottish Fishery

About twenty-five species are landed in Scotland by British vessels using the Danish seine-net. The dings of several of these, however, are insufficient from the point of view of weight or of value, or h, to be of outstanding importance to the maintenance of the fishery, and in 1938 almost 93% of the d and 95% of the value were attributable to cod, haddock, whiting, hake, plaice and lemon sole. se six species continued to be the mainstay of production after the war.

In addition to demersal fish seine-net boats now land quantities of Norway lobsters and squids; 955 the former totalled 21,325 cwt valued at £102,508, of which 93% were in respect of east coast ts. As previously mentioned a number of Anstruther and Leith fishermen frequently concentrate on capture of that species; they modify their nets for the purpose, and in the above year landings at the Districts accounted for 70% of the Scottish total. Other east coast landings are made in the Moray h, while on the west marketing takes place to a small extent at Stornoway, Oban and the Clyde. ids are landed at Aberdeen, Peterhead and Moray Firth ports and in 1955 they totalled 2,545 cwt ied at £4,776.

Table III gives a general indication of the relative importance of the principal species to the Scottish ery as a whole.

Early in the history of seine-net fishing in Scotland fishermen paid special attention to the capture lat-fish, plaice in particular. Although plaice continues to be a major objective in certain coastal ers, later development became accompanied by greater exploitation of round-fish. Cod, haddock, ting and hake together constituted 69·2% of the average landings in 1935 to 1938 as against 25·4% plaice and lemon sole; because of their relatively high prices, however, these two species provided e than half the value.

As the result of increased unit production of cod between 1946 and 1950 to more than twice the pre- level, the average total landings of the species rose by more than three times; the measures of increase ne landings of haddock and whiting were four and seven times respectively. Meanwhile the extension ne fishery to the West Coast was largely instrumental in advancing the average annual weight of e from 7,444 cwt to 30,531 cwt. In plaice the rise in total yield was limited to approximately 55%. nd-fish thus came to play an increasingly more important part in production and over the five years haddock, whiting and hake comprised 83·5% of the total weight as against 8·8% for plaice and on sole.

As the fishery continued to expand during the second half of the post-war decade the rise in annual l was in the measure of 27% above the 1946 to 1950 level of 1,131,262 cwt; cod, haddock and whiting ther accounted for 76% of the increase thus emphasizing the continued predominance of round-fish ne weight of landings. In the five years that group yielded 74% of the value as against only 18% for ce and lemon sole.

II. General Course of Landings of Principal Species

Fig. 4 shows for each of the principal species:

(a) average annual landings during 1935 to 1955 and the relationship of the respective yea totals to these.

(b) average annual landings per 100 arrivals in the above period and the relationship of t respective yearly totals to these.

(a) *Cod*

From 1935 to 1955 total seine-net landings of cod varied in quantity from a minimum of 39,036 c in 1940 to a maximum of 230,745 cwt in 1954, with an annual average of over 100,000 cwt. Landin were below the average in the first nine years and, except for 1945, exceeded it from 1944 to 1955.

Unit production increased sharply from 1935 to 1938 and in the latter year total yield reach 57,251 cwt, or 46% higher than in 1935. Little change occurred in 1939 but in the following year u landings fell to 82 cwt, the lowest recorded in the twenty-one year period. This, however, preceded period of almost uninterrupted increases in production whereby the 1947 total reached 147,157 cwt well over 2·5 times that of 1938. The weight of cod fell substantially in 1948, but, with the appearance extensive shoals of young marketable fish on the grounds in 1949, it rose to 155,600 cwt; following t less successful years, the increase continued rapidly to the maximum already mentioned.

(b) *Haddock*

Commercially haddock is the most important demersal species inhabiting the North Sea, and addition to being the main objective of the trawl it plays a significant part in the success of seine- fishing. During the twenty-one year period its annual landings ranged from 26,667 cwt in 1935 564,922 cwt in 1955: the annual average was 215,730 cwt and was thus greater than for any other spec

It is now well known that recruitment of haddock stocks is subject to violent annual fluctuations a according to published records (Fishery Board for Scotland, Annual Reports, 1935 to 1938), 1935 preceded by three years of comparatively moderate recruitment whereby the population of market sizes on the grounds was a relatively small one. Rich replenishment, however, emerged from a succes brood in 1935, and the Moray Firth became densely populated by young fish in 1936 while market stocks assumed unusually large dimensions in 1937. Recruitment on a smaller scale again helpe reduce supplies in 1938. This resulted in minimum landings in 1935, averaging only 58 cwt per arrivals. The very successful brood produced in that year, however, led to the Moray Firth becom densely populated by young fish in 1936 while the marketable stocks became unusually large in 19 These two sharp increments raised unit production to 315 cwt in 1937 and yielded the unprecedent total of 148,426 cwt. Poorer recruitment after 1935 led in turn to the comparatively low averag 112 cwt per 100 arrivals in 1938, with further reduction in 1939.

In the next five years landings were at a higher level and in 1944 they totalled 117,115 cwt or 212 per 100 arrivals, of which the former was 46% greater than in 1943. This marked the initial stage another period of high production, and, when a peak of 471,196 cwt was reached in 1947 it represe a unit average of 673 cwt. However, the decreased prosperity in the fishery in the next two years marked by a considerable fall in haddock landings, and in 1949 unit production declined to 351 and the total to less than one-half of the 1947 peak. In the next three years production continued nea level and averaged 232,500 cwt per year. More abundant stocks were encountered by 1953 and 1 when unit landings ranged from 534 cwt to 628 cwt; the ascent to the maximum total yield in 1955 also helped by the greater effort directed to the fishery.

(c) *Whiting*

Early in the history of seine-net fishing the landings of whiting were usually small, but as fleets increa in numbers and operations extended to a wider field it became a distinctly more important compon of the landings, and in 1938 its total reached 58,301 cwt.

During the war greater concerted effort on the capture of the species, because of the urgent f requirements, and possibly the presence of increased shoals on the grounds, added considerable ann

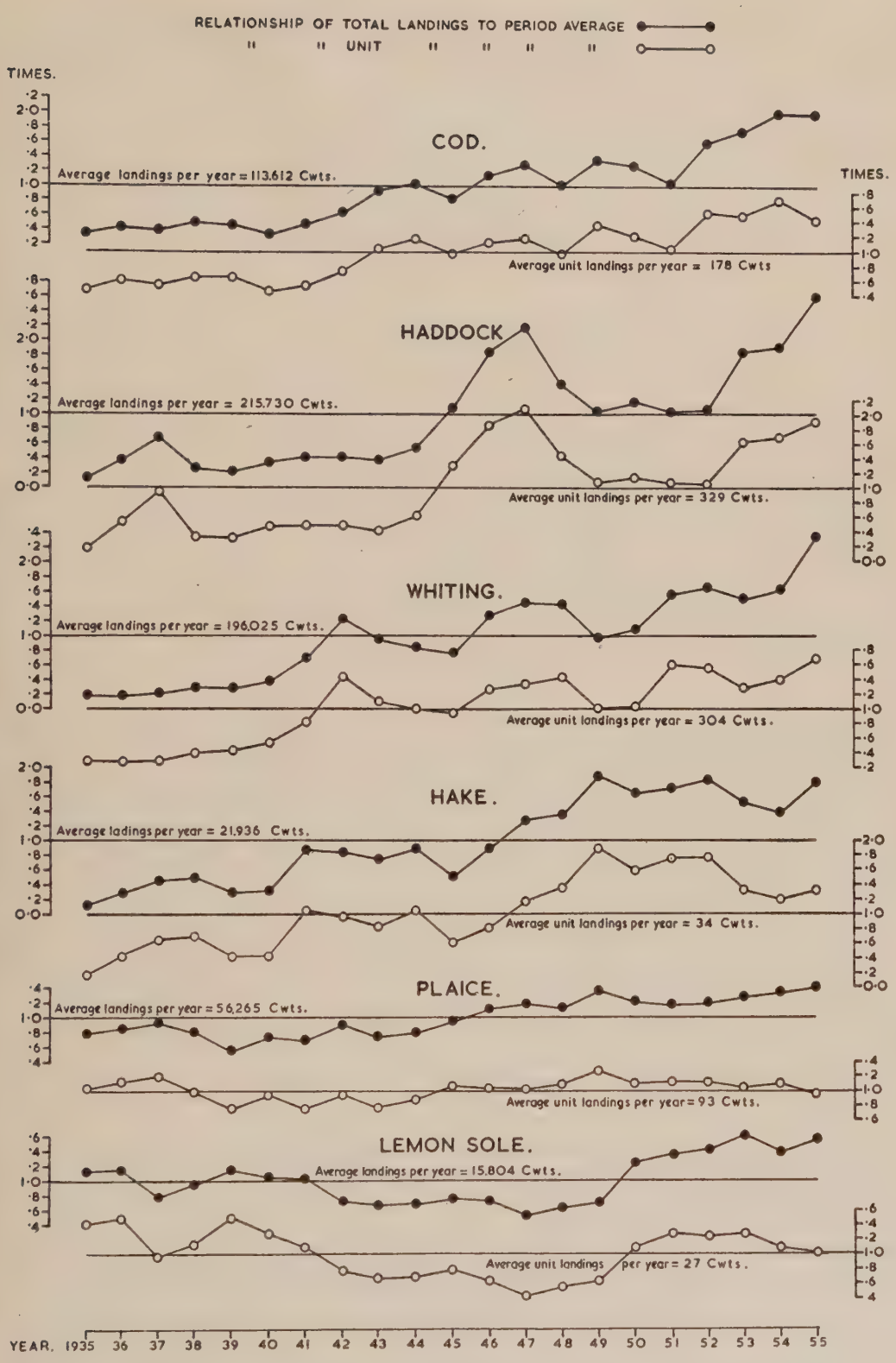
RELATIONSHIP OF TOTAL LANDINGS TO PERIOD AVERAGE
" " UNIT " " " "
TIMES.
COD.
Average landings per year = 113,612 Cwts.
Average unit landings per year = 178 Cwts
HADDOCK
Average landings per year = 215,730 Cwts.
Average unit landings per year = 329 Cwts.
WHITING.
Average landings per year = 196,025 Cwts.
Average unit landings per year = 304 Cwts.
HAKE.
Average ladings per year = 21,936 Cwts.
Average unit landings per year = 34 Cwts.
PLAICE.
Average landings per year = 56,265 Cwts.
Average unit landings per year = 93 Cwts.
LEMON SOLE.
Average landings per year = 15,804 Cwts.
Average unit landings per year = 27 Cwts.
YEAR. 1935 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55

Fig. 4. Scottish Seine Net Landings of Principal Species—Years 1935–1955

increments to the landings of that period, and a peak of 241,615 cwt was attained in 1942. A slight f occurred in the next three years, but after 1945 the extension of fishing to deep off-shore waters of t North Sea and its expansion on the west coast added considerably to the weight of landings.

From 1946 to 1948 landings averaged 271,868 cwt per year and despite a decline of 29% in 19 the total remained nearly three times that of 1938. Thereafter an almost uninterrupted sequence increases followed and, despite the application of the revised legal mesh in 1954 and the increase fr 8 in. to 10 in. in the minimum size of the species permitted on the United Kingdom market, its product continued on an upward course and in 1955 a maximum of 459,379 cwt was landed. This was nea eight times the 1938 total.

(d) *Hake*

From 1935 to 1955 seine-net landings of hake ranged from 2,334 cwt in the first year to 41,100 c in 1949 and averaged 21,936 cwt per year. They were under the period average until 1946 and thereaf exceeded it.

In the first four years landings rose sharply from the minimum to 11,295 cwt and averaged 7,444 c per year. A decline followed in 1939 and 1940 but increased production was a general feature of the w years and from 1941 and 1945 it averaged 16,912 cwt per year.

Later development in the capture of hake by seine-net boats was associated with the opening up new grounds off the west coast, and in 1946 landings amounted to 19,415 cwt or 73% greater than the previous year; in the next two years they averaged 28,469 cwt, and the attainment of a maxim of 41,100 cwt in 1949 represented a further advance of 40%.

During the last six years of the post-war period boats maintained a uniformly high production wh averaged 36,102 cwt per year.

(e) *Plaice*

While the plaice population located in Scottish waters is small relative to that of the Southern N Sea the species offers a valuable source of revenue to seine-net fishermen.

Before the war landings were derived almost wholly from the Moray Firth and Bye-law areas, the post-war extension of the fishery has supplemented these by catches from more distant grounds.

Landings increased from 31,548 cwt in 1935 to 78,885 cwt in 1955 and averaged 56,265 cwt per y The average is thus slightly over one-quarter of that of haddock, and is exceeded also by those of and whiting.

In the four years prior to 1939 average annual yield was 46,861 cwt or 99 cwt per 100 arrivals, throughout most of the war period the species played a less distinctive part in the fishery, and the aver fell to 40,797 cwt. An improvement followed in 1945, however, as the result of developments on east coast. From that time until 1955, while little change occurred in the unit production of the spec the greater frequency in catches landed at the various ports maintained supply at a consistently hi level of 69,475 cwt per year, or 23% greater than in 1935 to 1938.

(f) *Lemon Sole*

The lemon sole is a much less numerous species than those already mentioned but its relatively h market value adds considerably to its importance to the seine-net fishery. In the twenty-one years land ranged from a minimum of 8,169 cwt in 1947 to 25,310 cwt in 1953 and averaged 15,804 cwt per y

Landings were above the period average in 1935 and except for 1937 and 1938 they remained al that level until 1941. Thereafter they showed a steady decline and remained at a comparatively level until two years after the 1947 minimum was reached. From 1950 onwards however, a dist improvement followed and increases were accompanied by rises in unit production. Annual total landings were therefore above those previously recorded and in each of the four years to 1955 t exceeded 20,000 cwt.

I. Species in Relation to Sector and District Fisheries (Table IV)

Before the war the landings on Moray Firth ports were particularly abundant in cod, haddock and mon sole and fishermen there benefited from all but a small part of the income derived from these ecies. The Sector accounted for two-thirds of the production of whiting and three quarters of hake, e remainder in each case being landed chiefly on the west coast. Plaice landings at Moray Firth rts, although also greater than elsewhere along the coast, were limited in quantity to slightly under e-half the total for the whole coast. The fishery located along the territorial zone of the East Coast ght produced 33·9% of the total weight but the better quality fish landed in the Moray Firth Sector elded a relatively higher proportion of the value of the species.

The data for the post-war decade not only provide concrete evidence of the tendency towards more iform coastal distribution of the landings of the different species and their value but also clearly dicate the extent to which the composition of the Sector fisheries has changed.

Up to 1955 a slight decline occurred in the average weight of lemon sole landed at Moray Firth ports, t this was more than balanced by increases in plaice. As a whole however, the Sector became more phatically dependent on round-fish, and in this respect it was greatly helped by the increased prom-ence of cod and whiting in the landings.

The wider fishing field now occupied by the component fleets not only increased the landings of ice at ports of the East Coast Bight but also brought about a greater representation of lemon sole, ile slightly more hake were landed and much more cod. The chief development, however, lay in the creased production and value of haddock and whiting. A substantial part of the value of the seine-net dings of these two species came from the Sector, particularly in the case of whiting of which the ight as well as value during 1951 to 1955 was more than one quarter of the total.

An increase also occurred in the landings of plaice at south-east coast ports and at Shetland, but both Sectors development was again associated primarily with round-fish. Whereas success in Shetland s dependent almost solely on the capture of haddock and whiting, on the south-east coast cod was o of outstanding importance.

The landings of plaice and lemon sole on the west coast also increased. Cod, however, became a re prominent feature in this Sector and in 1951 to 1955 its average annual landings advanced to more n ten times the pre-war level. Whiting, the most important species before 1939, continued to occupy a ding place chiefly on account of its importance to the Clyde Districts, and in the above five years its al was six times the mean for 1935 to 1938. The greater seine-net production of hake was chiefly ated to development on the west coast, 70% of its weight and value being landed there; the Sector o accounted for one fifth of the weight of haddock.

The relationship of species to the District fisheries comprising different Sectors are shown in Tables to VIII.

(a) *Moray Firth* (Table V)

Before the war plaice landings at Lossiemouth were incidental in part to the general operations of fleet and in part to the activities of boats in the upper reaches of the firth, on grounds adjacent to nursery shoals of the species. The extension, however, of the main fishing to a wider area of the firth ught the boats into closer contact with round-fish and, in addition to landing large supplies of cod, ddock and whiting, they accounted for over 80% of the Sector total of hake. More than two-thirds the value of the fishery were derived from these species as against under 30% for plaice and lemon e.

At the adjacent port of Buckie nearly three-quarters of the landings consisted also of round-fish, but ce the early months constituted the main fishing season cod was the most prominent species. The ats, however, also landed plaice and lemon sole and these were in quantity sufficient to yield more than f the annual value.

The Whitehills, Macduff and Fraserburgh boats usually worked on grounds adjacent to the coast. arge part of the landings at the first two ports consisted of cod and haddock, but the grounds are also ductive of good catches of lemon sole and plaice, chiefly in the winter; these two were generally ponsible for more than half the yearly value. The Fraserburgh crews, while landing good catches

of cod in season, fished largely for lemon sole which yielded 62% of the value from 1935 to 193

On the whole flat-fish constituted the most remunerative element of the fisheries at Helmsdal Lybster and Wick on the north coast of the firth. In accordance with the proximity of grounds occupi by Helmsdale boats to the plaice nurseries at the head of the firth, the species was more prominent i the landings at that centre than at Lybster or Wick and, in the above four years, its average unit pr duction was 116 cwt as against 44 cwt and 37 cwt at the other two ports. Lemon sole is also a characteris element in the fish populations off the Caithness and Sutherland coasts but the grounds fished by Wi boats produced an average 109 cwt per 100 arrivals, as against 55 cwt at Lybster and 42 cwt at Helm dale; unit production thus varied in the reverse order for plaice.

Flat-fish, particularly plaice, comprised the main component of the small fishery at Thurso-Scrabste

As shown by Table V the fisheries at Lossiemouth, Buckie, Whitehills and Macduff have been di tinguished since the war by increased production of cod, haddock and whiting and in each of the tw five-year periods these constituted approximately 80% of the weight of the respective landings an 5% of their values. While cod also enters the Fraserburgh market that fishery is now characterised l the predominating influence of haddock and whiting. Hake landings are now more widely distribut over the Sector, but at Lossiemouth, which receives over 40% of the total, the species continues to carr greater importance than at other ports. At Lossiemouth, Whitehills and Macduff landings follow general the annual course pertaining to the Scottish fishery as a whole. Except in 1949, Lossiemouth receive much more haddock than any other species and in the ten years it produced more than one-third the value.

No significant change has taken place at Whitehills and Macduff in the production of plaice an lemon sole and both species continue as essential elements in the respective fisheries. At each port, hov ever, the landings of both cod and haddock are greater than whiting and now provide more than ha the total value. Haddock was the most prominent species during 1946 and 1948 but thereafter was ne in importance to cod.

For a short time after 1945 the operations of a number of Buckie boats brought them into conta with plaice on off-shore banks and in the first five years unit production of the species was greater th elsewhere in the Sector. Even with the addition of lemon sole, however, it contributed less than one-fi of the value of the fishery. At this time, on the other hand, during which the fleet was based alm wholly on the District ports, unusually large catches of haddock were landed, and in the five years to 1950 they averaged 1,441 cwt per 100 arrivals yielding 49% of the weight and 46% of the valu Reduced seine-net activity at Buckie in 1951 and 1952 effected a greater reduction in haddock than in a other species and its unit production fell to 354 cwt. Renewed activity at the port thereafter, particular by long distance vessels, brought a return to heavier landings so that for the five years 1951 to 1955 unit yield was maintained at an average of 885 cwt. It thus continued to play a more important pa in the weight and value of the fishery than any other species.

The disposition of the Fraserburgh fleet covers grounds favourable to the maintenance of extensi populations of both haddock and whiting and in the ten post-war years the port was responsible for 40 of the Sector landings of the latter species. Between 1946 and 1950 haddock accounted on the avera for 44% of the value of the landings and whiting slightly over 30%. More recently, however, whiting h sometimes been brought in in quantity sufficient to yield the greater financial return. During 1951 1955 its weight averaged 44% of the total, and its value was only 2% short of that of haddock.

No important change has taken place in the character of the Helmsdale and Lybster fisheries, so f as species are concerned, and annual variation in their composition reflects to a large extent changes the availability of cod and haddock. Scarcity of the latter led to a reduction in catch in 1948, but ea fishery benefited later on from improved supplies of both species. Flat-fish continue, however, to be characteristic feature of each fishery.

From 1935 to 1938 annual averages of 3,034 cwt of lemon sole and 1,310 cwt of plaice were land at Wick port to yield over 70% of the total value. Plaice landings increased in the post-war years— at many other ports—but no significant change took place in lemon sole. The annual value of each speci was trebled, but, on account of the increase in the importance of round-fish, it came to represent less tha 30% of the total for the whole fishery.

Table V shows that the fishery from Thurso-Scrabster now depends to a large extent on haddock, hich contributed more than half the revenue in the ten years.

(b) *East Coast Bight* (Table VI)

The grounds fished in St. Andrews Bay by Arbroath crews sustain a numerically stronger plaice pulation than those further north, and from 1935 to 1938 an average of some 9,500 cwt was landed 73% of the plaice landings in the East Coast Bight Sector as against 17% for Aberdeen and 10% for terhead. The species, however, constituted a larger proportion of the Peterhead landings than at the her districts, since it was only in times of scarcity that its fleet of small boats went beyond the three ile zone. Plaice, also the principal species on the grounds adjacent to Aberdeen, was likewise the main jective of operations there, although young haddock and whiting became a component of the catches the summer and autumn.

Lemon sole and plaice are got on the grounds fished by Stonehaven crews and together they formed e basic element in the catches: their value exceeded that of round-fish even at times when the latter re on the grounds in quantity.

By 1946, as the result of the extension of the fishery to more distant grounds, haddock and whiting d come to comprise 73% of the Peterhead landings, 42% being in respect of the first species. When a ger fleet operated in 1947 extensive increases occurred in both species, haddock reaching a maximum of ,959 cwt or 971 per 100 arrivals. Two years later its unit production fell by 30% whereas a rise of % occurred in whiting, giving it a maximum of 67,350 cwt. Up to 1950 the two species yielded more an 65% of the total value.

The main result of the falling off in seine-net activity by the larger class of vessel from 1951 to 53 was to curtail the landings of round-fish and in the latter year those of cod, haddock and whiting l to approximately 700 cwt, 1,700 cwt and 1,400 cwt. Meanwhile boats working inshore continued to id good catches of plaice which contributed 54% of the year's total value. With renewed activity in e next two years, however, haddock and whiting again became the main components of the fishery.

As at Peterhead, post-war developments at Aberdeen increased the production of plaice to an average 6,247 cwt per year or just under twice the relative 1935-1938 figure. Its average value increased almost times to £33,500, and in 1949, when round-fish were in limited supply, was equivalent to 31% of e total. Development as a whole, however, was again associated largely with increased exploitation of ddock and whiting. In 1946 and 1947 haddock represented a greater weight than whiting but the xt three years transferred the balance slightly in favour of the latter species. Their averages in the five ars were respectively 25,144 cwt and 25,867 cwt and this brought in over 65% of the value; plaice ded 21%.

The rise in the production of haddock and whiting, particularly the latter, was a feature of the next e years when whiting reached the unprecedented total of 98,446 cwt in 1952; it exceeded that of ddock in each year except 1955, when that species totalled 56,892 cwt—also a maximum. The respective nual averages were 40,828 cwt and 60,916 cwt and the latter produced a slightly higher proportion of e value.

The composition of the Stonehaven catches maintained the pattern prevailing before the war.

In the post-war years the weight of plaice landed by Arbroath boats increased by 11% and its value ched 48% of the total. While flat-fish thus remained the chief feature of the landings the greater rticipation in off-shore fishing brought round-fish more into the picture and in the ten years cod, ddock and whiting added an annual average of £31,400 to the revenue or 40% of the total.

(c) *South-East Coast* (Table VII)

Most of the plaice landed at south-east coast ports before the war were caught by Port Seton boats the Firth of Forth. They also captured small quantities of haddock, whiting and lemon sole but, as will seen from Table VII, cod was the only other species of importance. Between 1935 and 1938 the ight of plaice averaged 4,394 cwt per year and of cod 4,469 cwt, and together they constituted 80% the total.

Primarily as the result of the continued operations of a number of small boats within the firth, plaice

remains a more important factor in the economy of Anstruther and Leith fisheries than further alon the coast and in the ten post-war years these two districts accounted for respectively 42% and 47% the total for the Sector as a whole as against 11% for Eyemouth.

For all that, when in 1946 and 1947 haddock were plentiful on the main grounds fished by Anstruth crews, it was the main component of the catches, yielding on the average 40% of the revenue. In 194 however, the decline experienced in both haddock and whiting was partially offset by the greater catch of cod, and from then on to 1955, when that species was more readily available than any other, it co tinued to be the most prominent feature of the landings. In the ten years, therefore, it was the princip source of revenue and together with haddock and whiting accounted for 69% of the total.

In the early years after the war the fishery prosecuted from the south coast of the firth followed course similar in many respects to that of Anstruther. On the grounds fished east of the firth, howeve that fleet maintained good catches of haddock as well as cod and from 1949 onwards these two speci became equal contributors to the fishery. In the ten years they yielded 56% of the value and whitin 13·8%. On the other hand, whiting now occupies first place in the weight of the Eyemouth landings an its value, which was equivalent to 28% of the ten years' total, competes strongly with that of haddo and exceeds that of cod.

(d) *Shetland*

Plaice produced 80% of the value of the small fishery prosecuted from Shetland before the wa Increase in the production of haddock and whiting, however, which accompanied later developmen is evidenced by the fact that in the ten years to 1955 over 90% of the weight and value of the fishery w contributed by these species. They varied in relative importance during the period, however, and this shown in the following, which gives for each year their landings per 100 arrivals and their percenta contributions to weight and value:

	Haddock			Whiting		
Year	cwt per 100 arrivals	cwt %	£ %	cwt per 100 arrivals	cwt %	£ %
1946	890	71·8	74·7	302	24·4	18·6
1947	823	60·0	62·7	495	36·0	30·7
1948	694	61·2	60·8	365	32·2	28·0
1949	599	57·1	58·0	361	34·4	30·0
1950	736	59·5	65·1	401	32·4	25·9
1951	479	29·5	39·2	1060	65·2	53·1
1952	496	29·9	42·0	1073	64·5	49·9
1953	919	45·9	49·9	956	47·8	39·3
1954	1249	50·6	55·6	1074	43·5	34·6
1955	1303	56·5	59·7	853	37·0	29·2

In 1946 Shetland boats landed much more haddock, which continued to be the more product species up to 1950. In the five years its total value was nearly 2·5 times that of whiting.

In 1951 and 1952 a substantial decline in haddock was accompanied by a significant rise in whit the unit production of which was nearly 2·7 times that of the previous year. In the two years whi was also the greater source of value. A further change took place in the next three years; in 1953 cr encountered improved supplies of haddock and further increases took place in 1954 and 1955, unit y on the last year reaching a maximum of 1,303 cwt. The species thus regained first place in order of b weight and value, even although the landings of whiting were meantime well maintained.

(e) *West Coast* (Table VIII)

As shown in Table VIII boats fishing from Ayr and Campbeltown before 1939 landed valua quantities of plaice, this in the first district being chiefly the result of operations in Luce Bay. Whiti however, was the principal component of both fisheries, in which cod and hake occupied a minor pla

the Tarbert District the small boats working in the upper reaches of the Firth of Clyde fished chiefly for ice.

Developments since 1945 have not only intensified the exploitation of whiting by Ayr and Campbeltown fleets, but have also increased the representation of other species in the landings; the increase in ...it production of haddock late in the period is worthy of note. At Tarbert increased fishing activity ...o led to greater production of round-fish.

The mixed catches landed at Loch Broom since its development as a seine-net centre include haddock ...the principal species, yielding 40% of the weight and value, but it is noteworthy, having regard to its ...atively high market value, that hake appeared in considerably more abundance in the landings ...ring the earlier years of the fishery than later on.

It would appear that the catches landed at Oban generally include more haddock, whiting and hake ...n at Loch Broom, but less cod. In the five years to 1950 the average weight of whiting exceeded that ...oth hake and haddock, but all three species contributed approximately equally to the value, amounting ...all to 93% of the total. That changes may take place in the availability of the above important species ...the Oban grounds is shown by the fact that, while the average unit production of haddock and hake ...reased substantially in the next five years, that of whiting declined by 43%; for the period, therefore, ...% of the total value was in respect of the first two species as against only 14% by whiting.

Hake is the most important species landed at Mallaig, and in the ten years it contributed over 40% ...the value.

FISHING AREAS AND COASTAL DISTRIBUTION OF LANDINGS IN 1954 AND 1955

Definition and Relative Importance of Fishing Areas

In the collection of statistics of fish landings at Aberdeen, including those of seine-net boats, catches ...recorded in schedules showing for each boat the weight composition of landings and the grounds ...ed. Circumstances have prevented the general application of this scheme to other seine-net ports, ..., as mentioned earlier, some improvement has lately been achieved whereby it is possible to relate ...nthly landings at various districts to widely defined areas of the fishing field. A scheme on these lines, ...ich is being developed and improved, has been in operation for two complete years, 1954 and 1955. ...ile the scheme is insufficiently refined for the adequate examination of all problems relating to the ...ery, it nevertheless provides valuable information concerning the distribution of fishing effort and the ...gin of landings. It also permits an understanding of some of the events pertaining to the seasonal ...secution of the fishery and its seasonal productivity.

The Areas, shown in Figures 5 and 6, are defined as follows:

...a I—Shetland, including grounds fished by boats from that district.

II—North of the latitude of Rattray Head (Aberdeenshire) and east of Long. 3°W, excluding Areas I and III.

III—Moray Firth, of which the seaward boundary is a line from Duncansby Head to Rattray Head.

IV—East Coast Bight, covering grounds south of the Latitude of Rattray Head and West of Long. 1°40′W.

V—South of Rattray Head and east of Long. 1°40′W.

VI—North of Scotland, including grounds north of line Cape Wrath to Butt of Lewis.

VII—West Coast, north of Lat. 57°N, but excluding Area VI.

VIII—West Coast, south of Lat. 57°N, excluding Area IX.

IX—Firth of Clyde and adjacent waters.

...Except for the possibility of small discrepancies in the data from Areas I, IV and V the records are ...sidered to give an accurate representation of the recent disposition of fishing effort and the relative ...ortance of each Area as a source of supply. A small number of catches allocated to the Shetland Area

AREA FISHERIES YEARS 1954-55

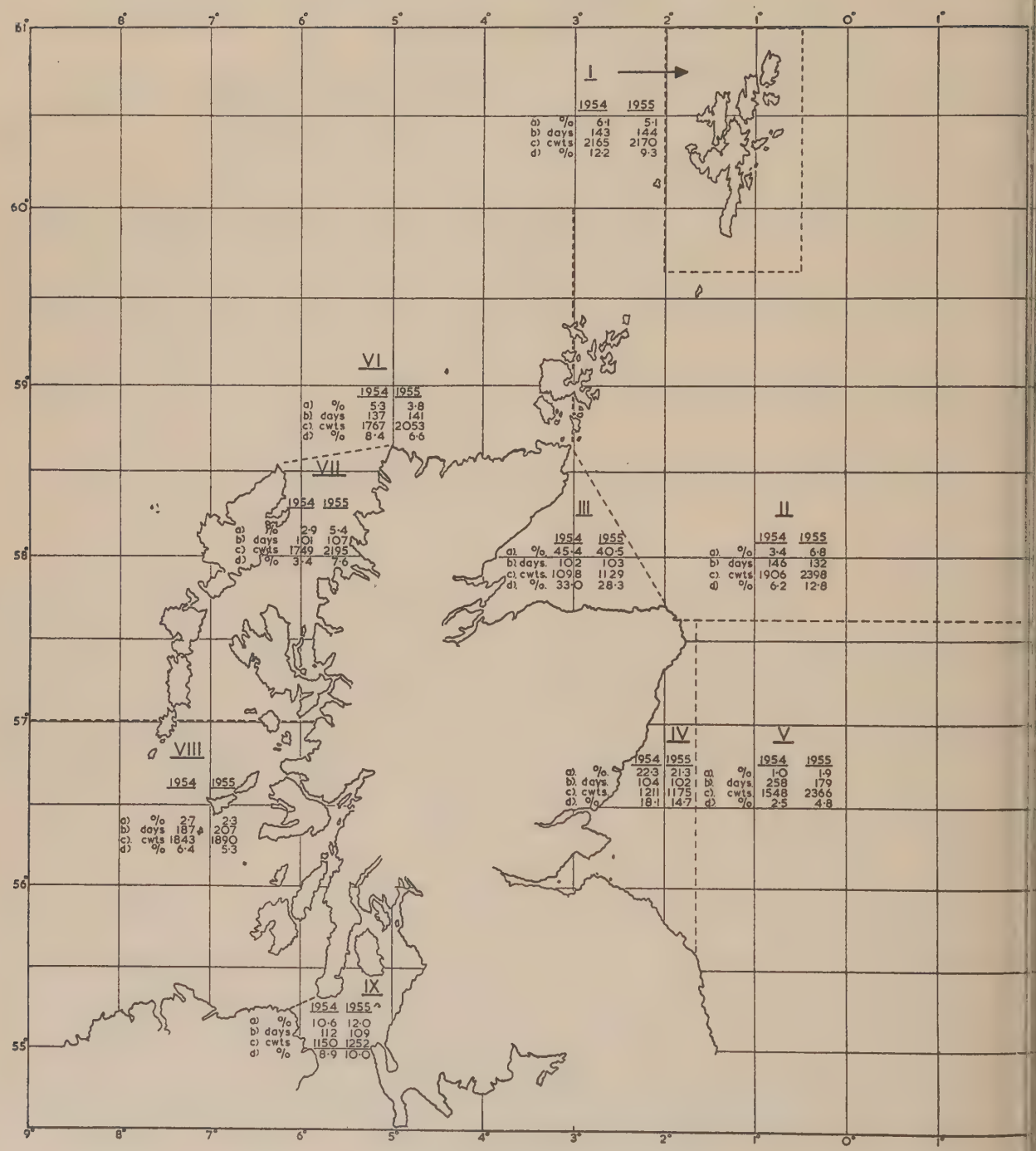

Fig. 5. (*a*) Percentage proportions of years' total catches.
(*b*) Average days' absence per 100 catches.
(*c*) Average total landings per 100 days' absence.
(*d*) Percentage proportions of years' total landings.

me from over its border where occasional crews may operate in the summer. The data for Arbroath, ıstruther and Eyemouth Districts are recorded wholly for Area IV; in the summer, however, a number the larger boats may cross into Area V, but this has no serious effect on the accuracy of the data since me of these catches are now landed in Aberdeen and included in the records for that port.

In the records, daily trips to the fishing grounds are reckoned as one day's absence from port, while trips of longer duration the calculation of days' absence covers the day of departure, but not the day return to market. On the average every hundred seine-net catches landed in Scotland in 1954 and 55 represented an absence of 112 days from port; it is clear, therefore, that, despite the more extensive hing field covered by the post-war fleets, it remains characteristic of their operations that most trips e conducted within comparatively short sailing distance from the respective marketing centres.

In Fig. 5 the following details are given for each fishing Area for each of the years 1954 and 1955:

(a) percentage proportions of annual numbers of Scottish seine-net catches attributable to the Area.
(b) average days' absence from port per 100 catches.
(c) average total landings per 100 days' absence.
(d) percentage proportion of annual total weight of Scottish seine-net landings attributable to the Area.

The 2,000 square miles covered by the Moray Firth yielded 35,483 catches in the first year and ,804 in the second; as these are 45·4% and 40·5% of the respective totals for the whole seine-net ning field they are indicative of the extent to which the firth remains the main centre of fishing. In this pect it is followed by the East Coast Bight although the catches from that Area fall short of the above als by approximately one-half. Much less fishing takes place in Areas II and V, east of the Moray th and East Coast Bight, but, because of the consistent operations of Fraserburgh boats on the former unds they yield more catches than the latter. Catches from both Areas, however, vary conspicuously number from year to year and in 1955 they were higher than in 1954. While weather may be a determin- factor in these changes they are probably more significantly related to circumstances prevailing at e or more of the three centres along the Aberdeenshire coast.

In 1955 local and stranger boats landed a total of 4,757 catches from the Shetland Area as against 01 in 1954.

Excluding the Clyde Area, approximately 11% of the total catches landed in Scotland came from ters off the north and west coasts. A decrease in 1955 of 15% on the previous year's total of 4,135 m off the north coast, however, possibly reflects changing circumstances in the fishery from Thurso; t, on the other hand, it is indicative of continued development in North Minch waters that in 1955 ches numbered 5,012 as against 2,274 in the previous year.

Under favourable weather conditions fishing south of Lat. 57°N is conducted with conspicuous ularity each year, and the effort directed to the Clyde and adjacent waters has been such that its ches fell short by a small margin only of the combined totals for the three previous Areas.

Boats fishing in the Moray Firth and East Coast Bight Areas generally leave and return to port on same or next day, and on the west coast this is also characteristic of operations in the North Minch l Clyde. It is in Area VIII, the North of Scotland, as well as at Shetland and to the more distant ters of the North Sea that more prolonged trips are undertaken; in the case of the North of Scotland l Shetland this is largely due to boats landing in Moray Firth ports or Aberdeen.

It is clear from previous consideration of the factors influencing the productivity of seining that the e spent in actual fishing during each day's absence from port varies, not only in fleets occupying erent areas, but also in boats converging on the same grounds from different ports. Fluctuations in duction per 100 days' absence, whether in different parts of the sea or during different seasons of year, reflect, therefore, a number of conflicting circumstances under which fishermen pursue their ing, an over-riding factor being the abundance of fish on the grounds.

Average total production per unit effort is much smaller in the Moray Firth and in the East Coast Bight n elsewhere in the North Sea (Shetland waters included) and also falls short of the average for the rth of Scotland and grounds off the west coast, except the Clyde. As a result, however, of the distinctly her intensity of fishing in the Moray Firth that Area continues as the most productive, so far as total d is concerned; in 1954 and 1955 it produced respectively 397,240 cwt and 437,776 cwt of which the

former represented one-third of the Scottish seine-net total and the latter 28·3%. By contrast, the weig of fish taken annually from the extensive operations in the East Coast Bight is approximately one-ha that of the Moray Firth catch—in 1954 it accounted for 18% of the Scottish total and 14·7% in 195 In the two years also, production from the Moray Firth was greater than the combined totals of t three remaining North Sea Areas, while it exceeded or was nearly equal to that of the grounds to t north and west of Scotland, the Clyde Area included.

With regard to species, Fig. 6 shows the percentage proportions of the respective total landin of cod and other principal species attributable to each Area, and the average captures per 100 da absence. It will be seen that the Moray Firth was the principal Area for all species except hake.

Cod populations are extensively distributed in Scottish waters and the species is landed in quant by all demersal methods, chiefly during spawning concentrations in the early months of the year. far as seining is concerned the species is a productive one in all fishing Areas except Shetland, where occupies only a minor place in the composition of landings. As the major centre of fishing activity t Moray Firth was responsible for over half the Scottish total in 1954, and 46% in 1955, while East Coa Bight catches approached one-fifth of the total. On the west coast cod appear to be caught in great quantity in the North Minch, and on grounds within and in the vicinity of the Clyde.

Haddock entering the Moray Firth and East Coast Bight are a juvenile spill over from the ma stocks in the deeper water further out where much heavier catches are normally obtained; the shoa which remain in the firth for some two years before returning to the open sea, are generally of sufficie strength to allow the numerous fleet fishing there to yield an annual catch equivalent to more than or quarter of the total for the Scottish coast.

The large scale capture of haddock in Shetland waters and its importance to the fishery prosecu there is due largely to the extensive shoals of varying size and age composition converging on that Ar in winter for spawning and in the summer and autumn months for feeding. The annual yield avera about 15% of the total.

An important spawning area is also located off the North of Scotland. Stock recruitment from North-western North Sea, however, plays an important part in maintaining these and west co grounds as valuable sources of supply, and in both 1954 and 1955 captures from Areas VI, VII VIII accounted for approximately 30% of the coastal landings of the species.

The presence of haddock on the Clyde Area is generally limited to a short season.

Ellis and Jones (1956) have shown that research vessel captures of the two youngest broods of whi are greater off the South Moray Firth Coast than in the more northerly part of that Area, while t reach a greater density off the East Coast Bight than in the firth. There would appear to be a like position of the commercial sizes, since boats fishing the southern grounds of the firth also obtain be catches than further north, while in the Bight unit yield is likewise relatively high. In the two y 1954-1955 over 40% of the seine-net landings of the species came from the two Areas, the higher con bution of the firth being associated with its greater proportion of catches.

Boats working in the deeper waters of the North Sea, however, including the Shetland Area, ar contact with the main source of adult whiting supply, and their unit catches are, therefore, much gre than in the Firth or the Bight. A thinning of the stocks to the west of Orkney and in the North Mi effects a reduction in catches in Areas VI and VII, but a return to better fishing further south is poss related to the approximation of Areas VIII and IX to a centre of density located in the Irish Sea; to same cause also, may be ascribed the importance of whiting to the Clyde Districts.

In the winter and early spring the hake lives chiefly in deep Atlantic waters while in the summer autumn shoals move to the shallower coastal grounds. The latter period covers the breeding sea and the spawning fields described by Hickling (1935) include grounds located both north and south Lat. 57°N on the west coast. In 1954 and 1955 the three western fishing Areas yielded 79% and 7 of the total Scottish seine landings of the species. The unit catches indicate, however, that the speci a more prominent element in the fish stocks of the South Minch (Area VIII) than further north or so and in each year over 40% of the landings came from there. Other seine-net grounds, including the N Sea, also benefit from the summer and autumn movements, and in 1954 the Moray Firth produ 13·1% of the coastal landings and 15·2% in 1955.

AREA FISHERIES YEARS 1954-55

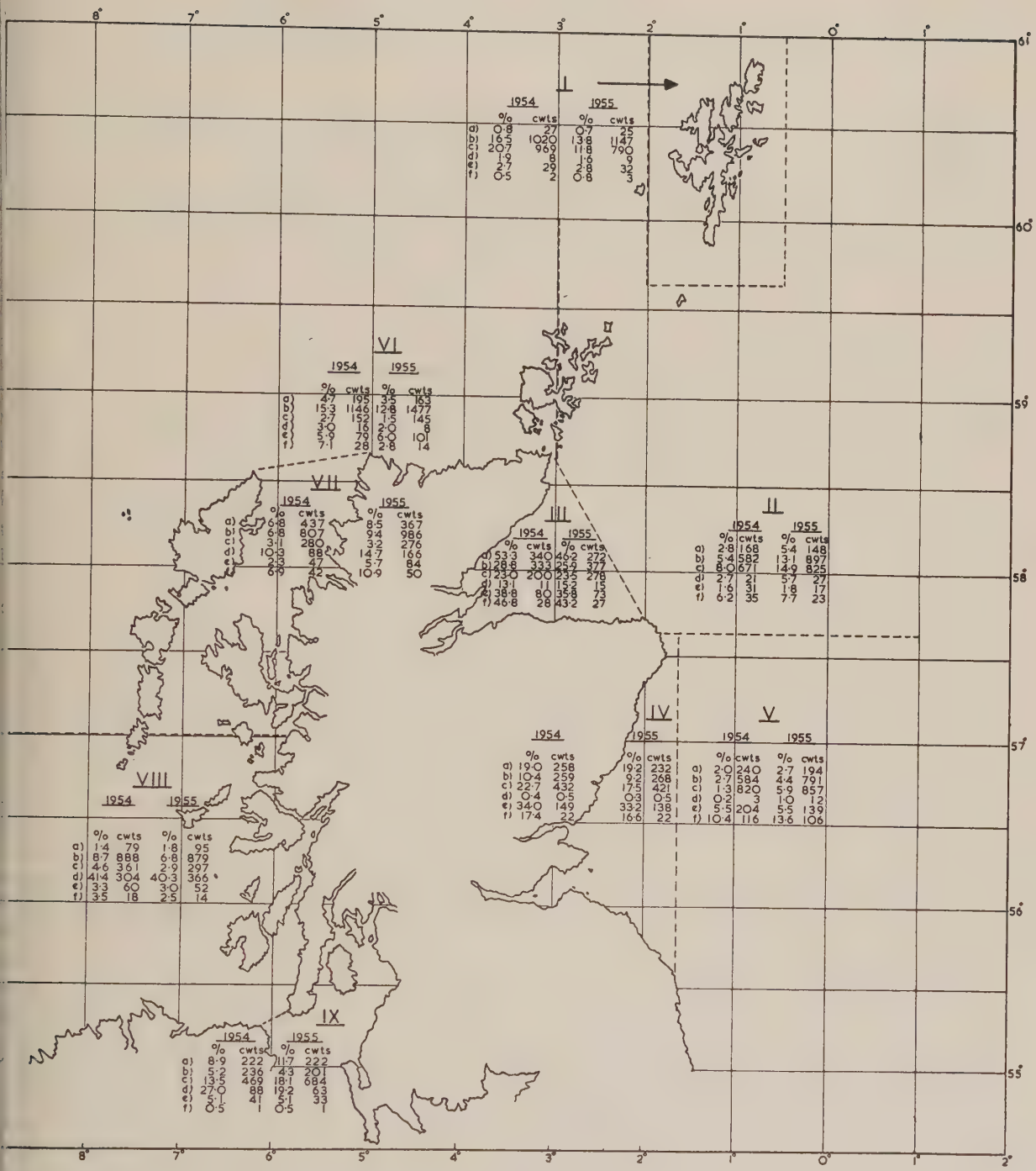

Fig. 6. Percentage proportions of years' total landings and average per 100 days' absence.

(*a*) Cod.
(*b*) Haddock.
(*c*) Whiting.
(*d*) Hake.
(*e*) Plaice.
(*f*) Lemon Sole.

In the two years the combined yield of plaice from the Moray Firth and the East Coast Bight w equivalent to 70% of the total for the whole of Scotland. The fleets operating in the Bight fish the off-sh banks as well as the juvenile coastal populations and their unit production is the greater; the m intensive fishing in the firth, however, yields a slightly greater total weight. The remainder of the landi of the species are spread over a wide fishing field, and good catches are taken from Area V and to a les extent from the North and West of Scotland.

Grounds within the Moray Firth also sustain a healthy population of lemon sole, but Rae (19 has demonstrated that the main distribution of this species includes the northern and central parts the North Sea. In Shetland waters, however, the populations seem to consist largely of small fish, and t may explain its limited representation in the seine-net catches from that Area. Approximately 62% the total landings are in respect of the Moray Firth and East Coast Bight, the share of the former be 45%. In the two years, however, best individual catches were obtained in Area V—east of the Bigh and despite the small fleet operating there its share of the total yield was in the measure of 10%.

II. Area Fishing Grounds and Importance to Marketing Centres

Having considered the importance of the fishing Areas so far as production is concerned it is c venient to give a brief account of the grounds fished by the respective fleets in order thereafter to as more precisely their importance to the various marketing centres.

Before the war the Lossiemouth District fleet fished over a wider area of the Moray Firth than a other. The smaller boats concentrated south of Lat. 58°N on grounds E.N.E. to N.W.×W. from port of Lossiemouth itself; from December to April, however, they were regularly accompanied by larger boats which exploited the cod shoals coming into the firth. Throughout the remainder of the y the larger units worked beyond 58°N and thereby benefited by the increased abundance of haddoc that time.

Seasonally operations in the Firth by the fleet based at Lossiemouth continue as before the although fishing north of Lat. 58° now extends well into the winter months. The more distant fish while occasionally including grounds eastwards of the firth, is nevertheless directed mainly to the N of Scotland; and it is noteworthy that the crews concerned, together with their colleagues from Buc shared in the opening up of Stormy Bank (west of Orkney) as an important centre of seine-net fish

Of the other Districts on the south coast of the Moray Firth the small fleet operating from Fraserbu before the war fished for flat-fish 3-5 miles off Aberdour, west of the port. Macduff and Whitehills c also worked there, although their main grounds extended westwards to the waters off Cullen. The boats operating from Buckie landed their catches from nearby, or fished in company with other Dis fleets off the north coast of the firth.

Units of the Fraserburgh post-war fleet sometimes visit Shetland waters and the north of Scotla they occasionally fish 70-90 miles S.E. to S.S.E. from Fraserburgh. The main components of the f however, operate east of the Moray Firth, within a broad arc extending 25-50 miles E.×N. to N. from the port: the grounds up to 20 miles N.E. to E.×N. are occupied principally in the winter. M shore fishing continues off Aberdour.

From Macduff District the majority of crews continue to favour coastal waters and up to 12 m seawards, while a number go out to the vicinity of Smith Bank. The Buckie fleet fishes a wide are the firth, while, in addition to favouring North of Scotland grounds, units may also be found further the North Sea. Landings from the North Minch are occasionally made at Buckie and Lossiemouth.

The main grounds frequented before the war by fleets from the ports of Wick and Lybster, and Helmsdale District, constitute a belt off the north coast of the Moray Firth two to ten miles w extending from off Noss Head (Caithness) to off Tarbat Ness. The part occupied by the Wick fleet from 3-10 miles E.×N. to S.×W. from the port, but a few boats also fished Smith Bank. The s Lybster boats normally fished not more than five miles off, but the more numerous Helmsdale seasonally occupied the belt south of Clythness.

Since the war no considerable change has taken place in the disposition of the respective fleets, occasional trips are made to Smith Bank by Lybster and Helmsdale crews, while in the summer V boats are occasionally found working 8-15 miles off Copinsay and 40-50 miles E.×N. to N.E.×E.

port. The shoreward part of the latter area, locally known as the "40 mile sea", is stated to yield small ıddock chiefly, and is fished only in times of scarcity elsewhere. Some Wick boats also participate in ıing off the North of Scotland.

As previously indicated, near-shore fishing characterised the operations of the small boats fishing ore the war from Peterhead, Aberdeen and Arbroath Districts. The Arbroath boats occupied the stal grounds from Stonehaven to St. Andrews Bay, but when fishing for round-fish they fanned out he vicinity of the Bell Rock.

The major scene of the fishery from Peterhead is now 15-75 miles E.N.E. to E.S.E. from Buchan ss, while at Aberdeen landings take place from a widely dispersed field, including Shetland waters ll those covered by the Fraserburgh and Peterhead fleets. The extension of operations by the larger ts of the Arbroath fleet to more distant waters has led to increased effort on or in the vicinity of the ıks beyond the Bell Rock; the following are the most favoured grounds, but in the summer trips still ther off are undertaken: (1) "Thirty mile Bank"—30 miles E.×S. to E.S.E. (2) "White Spat"—18 es E.×S. to 21 miles S.E.×S. (3) "Cockenny Reef"—22 miles S.S.E. to 25 miles S.E.×S. (4) "Wee ıkie"—30 miles S.E.×S.

Boat size and weather conditions, as well as the location of fish, play an important part in the choice grounds operated from Anstruther District, but they lie chiefly: (1) in Firth of Forth (2) 5-28 miles ×N. to S.E. from May Island, and (3) 3-5 miles East of North Carr Light (Fife Ness). It is customary for ıll boats to fish in the Firth but in the winter they are frequently accompanied by crews from outside. e near waters off May Island sustain a fishery all the year round; the fleet working there, however, ies in composition according to season, and the presence of small boats is usually limited to the summer nths when fish in the firth are less plentiful.

Port Seton fishermen continue to exploit the cod and plaice stocks in the Firth of Forth, but the most portant section of the fleet now works off the Bass Rock (at the entrance to the firth) to as far east as the tude of St. Abb's Head. There is a tendency, however, for the large boats to extend their operations n even wider field.

Fishing from Eyemouth takes place 45-60 miles N.E.×E. to E.×N. from Eyemouth, but the main rations are conducted on the following grounds: (1) 17 miles N.×E. ½ E., 20 miles E.×N., 12 miles .×E. and 7 miles S.E.×E. ½ E. from Eyemouth, and (2) 7 miles N. and 14 miles N.×W. from Abb's Head. As a rule the smaller units confine their activities to within the twelve mile zone, and in iods of scarcity further out or during bad weather they are joined by the larger vessels. Between uary and March a number of the crews capture cod N.E.×E. to E.×N. from Eyemouth, although, imes, they may have to change their grounds to 6-10 miles S.E. to E.S.E. from May Island.

Seining in Shetland waters before the war was confined to the spring and summer months but it is prosecuted all the year round. From May to September the numerical strength of the fleet is reduced ording to the number then engaged on herring fishing, but the principal season for seining, extending n October to December, coincides with relatively greater abundance of fish on the grounds. Operations conducted both east and west of the islands, and catches are landed chiefly at Lerwick, Voe and lloway. The disposition of the fleet varies according to the loci of abundance of the two principal ies, haddock and whiting; generally, however, it covers grounds within the fifty fathom line, which ks the seaward limit of a narrow shelf extending from the shore.

On the west side of the islands the main centres are the Burra Haaf, which extends from south-west ıe Mainland to the latitude of the Island of Foula, and off St. Magnus Bay and Yell Sound; on the the most important grounds are Norwick Bay, north and east of the Islands of Whalsay and Fetlar, na Firth, East of Bressay Island and Quarff and Sandwick Bays.

Fishing takes place in these areas all the year round, but in summer successful results may also be ained off Blue Mull Sound and Ronas Voe on the west, and 12-15 miles E. to N.E. from Balta Sound the east. Grounds recently developed include 20-27 miles E.×S. to E.S.E. from Bard Head, the hern extremity of Bressay Island.

Off the north of Scotland considerable fishing is undertaken between Holburn Head and Strathy ıt by crews sailing from Moray Firth ports as well as those based at Thurso-Scrabster. It would ear that little fishing takes place on Stormy Bank itself, but rather on grounds embracing the area

8-25 miles N.×E. to 35 miles N.×W. from Holburn Head; operations also extend as far west as Butt of Lewis. The boats work there all the year round, but successful results are said to depend o detailed knowledge of tidal and bottom conditions.

The boats based on the mainland ports of the North Minch prosecute the fishery 10-20 miles N. of Loch Clash and south of Scourie Bank, while others go over to grounds between Tolsta Head and B of Lewis in the Outer Hebrides; it is from the last area that landings are principally made at Stornow

In Area VIII south of Lat. 57°N. the grounds fished from Mallaig are located off the south-w of Skye and seawards of the Small Isles (Canna and Rhum in particular). The boats based at Ob however, cover a much wider field, including grounds off Dubh Artach, Skerryvore and Coll, as v as the passage of Tiree.

Fishing in the Clyde Area, within exclusive fishery limits, is conducted mainly by Luce Bay a Tarbert crews, the latter concentrating on grounds in the vicinity of Lower Loch Fyne and the Isla of Bute. Components of the Campbeltown and Ayr fleets frequently occupy the same grounds off San Pladda and Davaar Islands, and Ailsa Craig, but landings are also made in the latter District fr the northern parts of the Irish Sea.

Table IX gives, in percentage form, the distribution of the Area catches and landings to the m fishing centres in 1954 and 1955.

Although the landings made locally by Shetland boats account for most of the catches and fish ta from the Shetland Area, the consignments made direct to Aberdeen are also of considerable importan and in the two years they averaged approximately one quarter of the total.

The occasional landings by units of the Wick, Lossiemouth and Buckie fleets from off Copin and grounds beyond the defined seaward limit of the Moray Firth constitute a very limited proport of the total fish taken from Area II, which owes its importance largely to fishing from Fraserbu Peterhead and Aberdeen on the productive grounds off the north-east coast of Aberdeenshire. Of three fleets, however, that of Fraserburgh is undoubtedly the largest and in the two years it accou for 48% of the Area yield.

While boats from Peterhead also operate south of Rattray Head in Area V most of the fish taken f there are landed in Aberdeen.

Because of their better facilities the ports of the south coast of the Moray Firth absorb three-qua of the catches taken from that Area and an even higher proportion of its annual yield. The cat brought in by the numerous fleets working from Macduff outnumber those of other centres; in wei however, the District takes a secondary place to Lossiemouth, which accounts for more than one-t of the total landings from the Area. It is significant also, relative to its greater fishing capacity, tha the two years the numerically smaller fleet operating in the Firth from Buckie produced a weigh fish nearly equal to the Macduff total.

As to the East Coast Bight, only a small number of its total catches are attributable to the coa operations of Peterhead and Aberdeen fleets; the majority are the result of the much greater acti directed to the Area by the fleets landing at the ports between Arbroath and Eyemouth.

It is apparent from the Table that, while the grounds off the north of Scotland are most intensi fished by the crews based at Thurso-Scrabster the landings from that Area by the long trippers f Buckie and Lossiemouth add considerably to the landings of these two districts.

The extent to which the ports of Loch Broom District in the north and Oban further south are respective centres of distribution of fish caught in Areas VII and VIII is clearly demonstrated in Table, as is also the major importance of Ayr District so far as fishing in the Clyde and adjacent wa is concerned.

SEASONAL COURSE OF THE FISHERY

ENERAL

Although weather conditions have an important influence on the prosecution of seine-net fishing, main factors governing the seasonal distribution of its landings are seasonal changes in the abundance pecies on the grounds and seasonal changes in fishing intensity.

Figure 7 shows the seasonal course of the Scottish fishery as a whole by portraying events in the s 1954 and 1955.

When unusually heavy landings of cod were made in 1954 they averaged 259 cwt per 100 days' nce as against 222 cwt in 1955. Greater unit production in 1954 was characteristic of the landings nore than half the year, but was most apparent in the early months when spawning concentrations lly yield the best results. In each year a peak occurred in March but it is not exceptional for this to place somewhat earlier.

As cod becomes available in smaller quantity after spawning the species plays a less significant role ie landings, and in the autumn months in particular unit production falls to a comparatively low . A return to better fishing, consequent on restocking of the grounds fished by seine-net boats, iently begins before the end of the year, and that this occurred in both 1954 and 1955 is evidenced he increase in unit production in December.

Before the war haddock were landed in comparatively small quantity in the early months of the year; May however, landings were marked by a sharp rise and continued thereafter on a relatively high . Since the war, although the summer and autumn months have continued as the principal season he species, there has been greater uniformity in the seasonal distribution of its landings. Average production in the above two years was respectively 467 cwt and 542 cwt, but, even when below the age in the early months of each year, it was sufficient for haddock to play a part second only to cod e landings of that season. The increase thereafter is rapid, however, and soon brings unit production e the yearly average; it was maintained at that level from June to November in 1954, and to mber in 1955. It is worthy of note also that the greater yield in 1955 was partly due to better catches ng been consistently obtained in the second six months.

n general the landings of whiting follow the seasonal pattern pertaining to haddock.

n the two years average unit production of hake was respectively 33 cwt and 38 cwt. The species is ed in comparatively small quantity in the early months, but as the shoreward movement from er water is undertaken landings increase in weight, and unit production advances with almost terrupted regularity until a maximum is reached in July or August. Between July and September e two years its average was 71 cwt, but from the latter month onwards landings tended to taper off a return to a low level was reached by the end of the year.

Monthly unit landings of plaice ranged from 37 cwt to 137 cwt. It is a matter of considerable rtance that the approach to a peak occurring between July and October is associated with the th to marketable size of the older inhabitants of the inshore nurseries and their movement sea- ls, whereby they become an important source of supply on several of the grounds fished by the seine leets. While the species enters, therefore, into the composition of the fishery all the year round, its landings are significantly greater in the summer and autumn months than at other seasons.

The dispersal of the Scottish fleet over a wide area provides for a regular supply of lemon sole all the round.

Average landings of all species per 100 days' absence were 1,375 cwt in 1954 and 1,485 cwt in 1955. usual for unit production to increase in weight from January to March and during the heavy catches d in 1954 it was well above the average in February and March: as in 1955, however, when cod were able in much less quantity, total unit production may fail to reach the average in all three months. As cod disperse from the grounds and the landings of haddock as a whole are temporarily reduced, otal fish landed per unit effort declines in April to what is generally the year's minimum. The initial ulse of stock replenishment which follows is to increase unit production slightly in May and more lly in June. It reaches a maximum in August and continues above the average towards the end of ear.

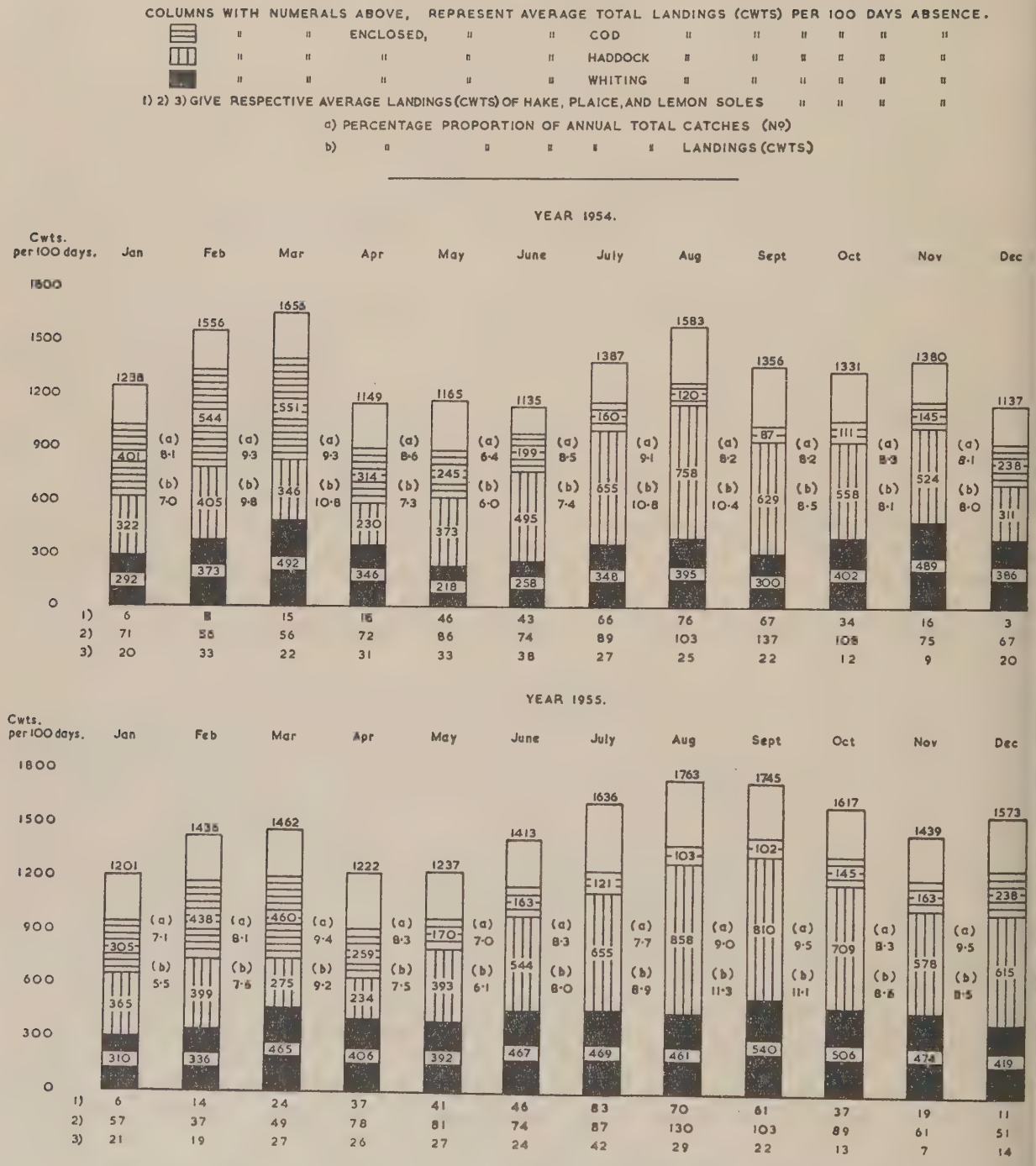

Fig 7. Seasonal course of Scottish Seine Net landings

Despite the varying factors influencing the prosecution of the fishery from different parts of the coast, d the periodic absence of boats at the herring fishing, there is no season in which the numbers of seine- t catches landed in Scotland do not represent a high degree of fishing activity. In 1954 they averaged 260 per month and in 1955 7,672, and it is noteworthy that the greater activity in the latter year is ot related to one season, but reflects greater fishing intensity throughout most of the year.

It is a regular feature for catches to increase in number from January to March. This is, of course, e season of most frequent interruption to operations by weather, but, when conditions are favourable ats operate in large numbers and in each of the above three months in 1954, and in March 1955, tches were above the respective monthly averages; the quarter's aggregate in the first year was 26·7% the year's total, and slightly under 25% in 1955.

Fewer catches are landed in the second quarter, largely as the result of a decline to minimum fishing tivity in May when part-time crews are preparing for the summer herring fishing and a number of e boats permanently occupied on seining are undergoing overhaul; nevertheless in each year approx- ately 23% of the total catches were landed during the quarter.

Although a slight falling-off in fishing may occur in December a high level of activity is nevertheless intained throughout the second half of the year. On the whole, however, the yearly catches tend be uniformly distributed between the first and second six months, and in 1954 when results from cod re distinctly favourable the first period yielded 50·2% of the total, whereas in 1955 the balance slightly oured the second period.

As to the relationship of the above events to the seasonal distribution of total yield, the association May of minimum activity with a comparatively low level of unit production establishes that month the normal season of low total yield; and, as the quarter of which May is a component covers the erval between the main cod season on the one hand and accelerated stock replenishment on the er, it usually contributes a slightly smaller part of the year's landings than any other. In the two rs it averaged 21% of the weight of landings, and 23% of the value.

The concentrations of haddock and other species on the grounds establish July to September as the st productive period of the year; in 1954 its landings comprised 29·7% of the total and in 1955 3%. This quarter is also frequently the most important from the point of view of value; it would pear, however, that in years of plentiful supply the cod season may be more helpful financially to the ermen than any other, and in 1954 the months January to March yielded 28·5% of the total value against 25·3% for July to September.

Area Fisheries

Having regard to varying conditions in the seasonal composition and exploitation of the fish stocks upying the widely dispersed field operated by the seine-net fleet, the Area Fisheries do not follow cisely the pattern described for the fishery as a whole. In Area V, east of the East Coast Bight, fishing onducted mainly in the summer and autumn months, and in 1954 over 85% of the landings were espect of June to October, and July to December in 1955. The seasonal courses for the Areas are sidered in Tables X and XI.

During the spawning season in the Moray Firth fishing for cod is very often patchy, but a high level nit production is consistently obtained from January to March, and in 1954 it continued above the r's average of 340 cwt until April. In the first quarter haddock and whiting also, while secondary in ght to cod, are of considerable value to the Area fishery. The decline in haddock which follows is eral to the seine-net grounds as a whole; in the firth, however, stock replenishment is not long delayed , following the rapid attainment of maximum unit production in July or August, catches continue to well maintained towards the end of the year. The importance of whiting is also highest in the summer later months, and reaches a peak between June and December. Fishing for hake opens in mid-May extends to the end of the year.

As regards flatfish, while catches of plaice are good all the year round and are highest in the summer autumn months, those of lemon sole are best in the first half of the year, after which a decline sets an improvement may become apparent, however, before the year is out.

The April-May season, which is characterised by a falling off in fishing effort as well as fish supply,

has a monthly average yield short of the other two seasons by over 40%, and in the two years it contribut only 10·8% of the total landings. In the first quarter the capture of cod may exceed the combined tot of other species and, when shoals were unusually abundant in 1954, monthly total production was 35 greater than in the corresponding period in 1955. The season therefore contributed 36% of the yea total yield as against 21% in 1955.

On the other hand the greater availability of haddock and whiting between June and Decembe the second year helped to give an average monthly total production 45% greater than in the sa period in 1954, so that the season's contributions to the respective years' totals were in the measure 70% and 54%.

The fishery of the East Coast Bight tends to divide itself into two seasons, namely, January to M and June to December. In the first three months of the respective years average unit production cod was 446 cwt and 283 cwt, as against 610 cwt and 512 cwt in the Moray Firth. It would appe however, that after March the shoals in the Bight are relatively slow to disperse, so that boats contin to obtain good catches of the species for a considerable time.

Haddock and whiting also constitute an important element in the fishery in the early months; la in the year, however, replenishment of the grounds by the former species is longer delayed than in firth, whereby best catches are not obtained until November or December. In whiting the catches only mount rapidly in the summer, but continue to increase in weight until October, when a peak reached. While unit production of plaice follows a course similar to that in the Moray Firth lemon s appear in the catches more regularly, and in greater quantity, in the summer and autumn than at ot times.

More than half the annual captures of cod, and a good representation of other species, comprise landings in the first five months; having regard, however, to the seasonal disposition of fishing effor well as shoal density the months June to December constitute the more productive season, and in the years they accounted for 73% of the total landings.

In Area II, east of the Moray Firth, fishing is conducted chiefly during the first nine months of year, when over 80% of the landings are made. It is in the summer that cod is most strongly represe in the catches, but its importance is always secondary to that of haddock and whiting.

In Shetland waters the average unit production of haddock in 1954 and 1955 was respectively 1, cwt and 1,147 cwt. In the first year its captures were above the average in January and February stocks recovered, following the spring decline, unit production again increased, and exceeded the ave between July and November. The species was less plentiful in the catches in the early part of 1955; n prolific recruitment in the later months, however, not only increased unit production above the aver from July to the end of the year, but produced a greater total weight than in the same period in 1

Whiting, the other principal species in the fishery, is also got in heavy supply during the first qua of the year and, in March 1954, unit production reached a peak of 1,573 cwt as against the year's aver of 967 cwt. A gradual decline to a June minimum followed and, although better catches were obtai from July to October, they averaged only 729 cwt per unit effort. More prolific shoals were encounte in November and December, however, and unit production rose to 1,927 cwt. The species continue heavy supply in the early months of 1955; in January it attained a unit measure more than twice year's average of 790 cwt and continued above the average until April. Later in the year, how comparatively poor catches were obtained and, between May and December, they fell to an ave of 521 cwt per 100 catches.

Having regard, therefore, to the seasonal changes in the availability of the two species, and to cha in fishing intensity, which is normally highest in the last three months, the year comprises four seas In the first quarter, which usually accounts for approximately 25% of the year's production, hadd prevailed over whiting in January and February 1954; the assumption, however, of the unusually l peak of unit production of whiting in March transferred the balance of the season's total landing that species. In 1955, on the other hand, whiting surpassed haddock throughout the quarter, and average monthly landings were 80% greater, as against only 8% in the previous year.

The composition of the catches shows less annual variation from April to June than at other seas and in each year whiting was the more productive species. The failure in 1955, however, of whitin

eat the previous year's steep recovery, together with the greater haddock supplies then on the grounds, phasises the greater economic importance assumed by the latter species in the second half of the year; l in the last three months, while its weight yielded to whiting in the first year, it was three times ater in the second.

The landings of cod and haddock from off the north and west coasts follow generally the course taining to the Scottish fishery as a whole. On the north grounds and those of the North Minch the line in cod in April following the heavy catches of the previous three months is one of considerable gnitude, the respective average unit weights for the two years being 530 cwt and 119 cwt in the first a, and 920 cwt and 139 cwt in the second. In both Areas catches are highest in January and February, le further south, including the Clyde, it is not until March that a peak in unit production is reached. Although boats working off the north coast and in the North Minch obtain good haddock catches he first quarter of the year, these may be considerably better further south on the grounds worked boats based at Oban; in each year catches per unit effort in that Area rose from approximately 800 in January to over 1,000 cwt in February and fell to under 400 cwt in March, the average for the rter being 723 cwt as against 512 cwt and 433 cwt further north. In the waters within and adjacent he Clyde catches of the species are always relatively small and are higher in the early months than at er seasons.

There is considerable fluctuation in the monthly unit production of whiting off the North of Scotland in the North Minch; in Area VIII catches are best at the beginning and end of the year but are high between July and September. In the Clyde the species is most productive early in the year ough, as in 1955, good catches may be encountered for a longer period. In all areas off the North West of Scotland the seasonal course of hake fishing portrays the pattern pertaining to the fishery whole, and it is a feature of the landings for unit production to be maintained at a consistently high l from April to October. In Area VIII, however, catches are generally higher all the year round than he grounds further north.

Plaice are got in varying quantity during the year in all Fishing Areas; this is likewise the case with on sole in the North Minch, but off the north coast the first six months constitute the main season this species, and in Area VIII the summer months.

As will be seen from Table XI the fisheries off the North of Scotland and in the North Minch are ded into two main seasons, namely, January to April and May to December. The presence of good olies of cod and haddock usually provide the boats operating on both Areas with good catches during opening weeks of the year. As the former species leaves the more northerly grounds, later in the on, a reduction in fishing effort normally takes place; fishing in the North Minch, however, is well ntained throughout the four months. The season's landings from the latter grounds are, therefore, paratively heavy and may account for over 40% of the year's total, as against approximately 25% he north coast.

Conditions dictating the seasonal distribution of fishing effort in Area VIII tend to divide the fishery four seasons. Although fish are plentiful on the grounds in the first two months and during the last ter of the year, fewer boats are then working, and each season contributes a relatively small part ie year's total yield. The months March to June and July to December are the most productive ons, and in the two years the latter accounted for over 45% of the total catches, and more than half of the landings.

In Area IX the first four months produce more than half the annual catches and a higher proportion e total yield.

IMPORTANCE OF SEINING RELATIVE TO OTHER DEMERSAL METHO

Table XII shows, for each of the years 1938 to 1955, (a) the total weight and value of demersal landed in Scotland by British vessels, (b) the weights and values attributable to the principal metho seine, trawl, great-line and small- and hand-line, and (c) the percentage contributions of the respec methods.

Allowing for annual fluctuations of varying intensity, the landings of demersal fish in Scotland British vessels using different types of gear were maintained at a consistently high level for a long per of years before the war, and in 1938 they totalled 2,504,000 cwt, which is only 8% less than in 1913. T trawl section of the industry delivered most of the catch, its contribution being 73% in 1913 and 76% 1938. In the former year great-lines and small- and hand-lines supplied most of the remainder, but the interval the combined landings from these two sources fell by 47%, and their contribution to 13 meantime the yield of the seine-net increased to 10% of the total.

Despite serious difficulties encountered in the prosecution of the white-fish fisheries during the w landings by all methods did not recede to less than 60% of the 1938 total, and were short of it in 1 by only 15%. Following the return of fishermen to their normal occupations, landings increased in 1 to 3,090,000 cwt, and thus initiated a new phase in the white-fish production of the Scottish fisher A maximum of 3,635,000 cwt, 45% greater than in 1938, was reached in 1947, and in the next ei years it was maintained at an annual average of 3,200,000 cwt.

While war-time conditions favoured the continued development of seining, depletion in the numer strength of the trawling fleet, together with restrictions on the grounds available for fishing, curta production by that method; despite striking increases in the weight of individual catches, its landi fell to 819,000 cwt in 1941, or considerably less than one half the 1938 total. Innumerable difficu were encountered by this section of the industry in the early post-war years, particularly in fishing po by the ageing of many of its components. Thus, while the majority returned to fishing after hostil ceased, the numerical peak in the post-war decade was only 236, as against 320 in 1938 and, with repl ment at an early stage of development, the decline continued to 210 vessels in 1955. In the circumstan while above the 1938 total between 1946 and 1949, trawl catches failed to reach that level in the nex years.

From 1938 to 1955 seine-net landings increased nearly six times and their value more than ten ti This outstanding development effected a significant change in the pattern of life of the communi concerned and maintained their prestige as centres of industrious fishing activity. The details of unique progress, together with the events associated with the trawling are amply presented in the Ta which emphasises the importance assumed by the seine-net method, for the time being at any rate, productive source of supply to the Scottish demersal fisheries as a whole. During the war its landi averaged approximately one half of the trawl total, and thus played a leading part in maintaining supply at a comparatively high level; of greater significance, however, are the results of its develop in the later post-war years, when production and value progressively rose to a peak representing 4 and 42% of the respective totals by all methods.

Great-line fishing in Scotland is prosecuted by both steam and motor boats; these fish in Icela and Faroese waters and on grounds to the north and west of Scotland, while occasional trips have been made to Greenland. Aberdeen is the chief centre for this fishery, but landings are also mad Peterhead and Fraserburgh and ports on the west coast.

In 1938 landings were short of the seine-net total by 30%; a decline took place in the prosecutio the fishery during the war and, on the average, production fell by one-half. A period of increased ef followed, and a maximum yield of 321,000 cwt was reached in 1949; this, however, was well un one-half the total for the seine-net and produced only 10% of the landings by all methods and 13% their value.

Production was well maintained in 1950, but later on a large number of the steam vessels engage great-lining reverted to trawling, while the seasonal occupation of drifter-liners on the method beca

; frequent. Landings accordingly soon fell to below the pre-war level, and in 1955 they yielded only
% of the total by all methods and 4·8% of the value.

From 1922, the year after seining was introduced, to 1938 small- and hand-line landings fell from
,919 cwt to 175,000 cwt of which the latter represented only 6·1% of the total by all methods and
% of the value. The decline continued precipitously during and after the war, and in 1949 landings
to approximately one-third the 1938 total. While a slight recovery followed in later years small- and
id-lining continued to play only a small part in the economy of the fisheries as a whole, and in 1955
production was approximately one sixteenth of that of seining.

A large part of the demersal fish landed in Scotland by British vessels is taken from the North Sea
l grounds to the north and west of Scotland. In the following are given the total weights of the six
ncipal species landed from that area in 1938 and the respective proportions attributable to the two
ef methods, seine-net and trawl:

Year 1938	Cod	Haddock	Whiting	Hake	Plaice	Lemon Sole
Totals cwt . .	389,207	928,806	313,592	33,818	68,590	54,622
Seine-net % . .	14·7	6·0	18·5	33·4	66·1	27·6
Trawl % . .	65·9	86·6	75·9	59·3	29·9	72·4

Before the war the seine-net method competed strongly with the trawl in the capture of hake, and
; the main source of plaice; the trawl, on the other hand, was the predominating factor in the supplies
od, haddock, whiting and lemon sole. A remarkable change since the war, however, in the distribution
he landings of the different species between the two methods gives further evidence of the important
e now assumed by the seine-net in the capture of demersal fish (Table XIII).

In 1946 cod landings rose to approximately 542,000 cwt or 39% more than in 1938; but, while this
accompanied by an increase to over 2¼ times in the seine-net total the trawl remained the major
rce of supply. A sharp decline in the next five years reduced the 1951 total to 320,000 cwt; however,
his was due largely to a falling off in trawl landings, a considerable rise in the relative importance
he seine-net took place. Production was on a more intensive scale from 1952 to 1955 when average
l yield exceeded that of 1951 by 60%; progress in seine-net fishing was the main, contributing factor
his development, and each year its increasing total narrowed the gap between the production of the
methods until in 1955 it was only 3,500 cwt short of the trawl.

In the first post-war year 22% more haddock was landed from the Scottish fishing area than in
8; a further increase took place in 1947, while landings were well maintained in 1948. The decline
tocks which followed, however, effected a progressive reduction right on to 1952, when the total was
rly 32% below that of 1938. This was the general pattern followed by both the trawl and seine-net
eries, but, whereas the yield of the latter rose to one-third of the total, the trawl catch failed to
roximate its pre-war level; the next three years were also expressive of the advances made by the
e-net, and in 1955 its landings were only 32,000 less than the trawl.

In 1938 British vessels landed 313,600 cwt of whiting from the main, Scottish, fishing grounds; this
less than the cod and only about one third of the haddock total. Greater attention has been directed
his species since the war, however, and its landings exceeded those of cod in eight of the ten years
the haddock total in 1952. The increase in 1946, relative to 1938, was 70% and despite a falling-off
upply in 1949 and 1950 the average yield for the five years was maintained at 50% above the pre-war
re. From 1951 to 1955 production rose to an even higher level, to give a maximum of 774,000 cwt in
2 and a further advancement of 50% in the annual average.

The trawl, of course, was the main source of supply before the war and contributed three-quarters of
total. That method also participated in considerable measure in the post-war development in
ortance of the species but, without doubt, a more significant part was played by seining, the landings
which exceeded those of the trawl in six of the ten years.

Although hake cannot be regarded as a major source of supply to the Scottish fisheries, its landings

have increased considerably since the early part of the present century. From 1904 to 1913 they rang between 17,000 cwt and 34,200 cwt and averaged 21,400 cwt per year. Between the two wars, landing while fluctuating considerably from year to year, showed a general increase to an annual average 32,400 cwt, with a peak of 57,800 cwt in 1924. The species is fished in the North Sea, but more so grounds to the north and west of Scotland, and in 1938 the total from the entire area was 33,818 cwt, which 60% was contributed by trawl and 33% by seine-net.

In 1946 landings were well above the 1938 mark and in both 1949 and 1950 a peak of 102,000, 77% greater than in 1924, was recorded; they continued near this high level in the next two years a although a distinct reduction in supply followed, the catch for 1955 was still above the highest pre-w total. Both trawl and seine made significant contributions to the early post-war supplies during wh the trawl retained its position as the major instrument of capture. The fall in total yield in later yea however, was intimately associated with a decline in trawl production to below the 1938 level where with continued development on the west coast, the seine-net became the principal contributor to t landings.

In 1938 the landings of plaice by all fishing methods amounted to 68,590 cwt, and, as many of units operate near the main populations of the species, the seine net accounted for two-thirds of t total; from 1946 to 1955 landings increased to an annual average of 91,750 cwt and the proporti attributable to the seine-net rose to over 75%. In 1946 and the following three years fishing for lem sole yielded poor results and the landings by all methods averaged less than half the 1938 total of 54,6 cwt; although a substantial improvement followed, it was only in 1953 that the pre-war level w exceeded. As indicative of the causes implicit in these events Table XIV shows that throughout the t years the trawl failed to reach its pre-war level of production, and that the operations of the seine-n were again the significant element in the improvement which took place in 1950.

NOTE ON THE FISHERY FOR THE YEARS 1956 AND 1957

The Table below shows the numbers of seine-net catches landed annually in Scotland from 1955 1957, the weights and values of their demersal landings, and the respective totals per 100 catches:

Year	No. of catches	Total cwt	Cwt per 100 catches	£	£ per 100 catches
1955	91,857	1,529,562	1,664	3,791,323	4,127
1956	93,162	1,648,660	1,770	4,365,663	4,686
1957	101,529	1,894,920	1,866	4,982,434	4,907

As the result of greater production per unit effort and an increase of 10·5% in the number of catch landed, the total yield of the fishery in 1957 exceeded that of 1955 by 23·9%; the value increased 31·4%. Yield and value represented respectively 46% and 44·8% of the totals from all methods practi by British vessels in Scotland, as against 47·7% and 48% for trawl.

The following gives the total landings at each Sector of the coast in 1957, the percentage increa relative to 1955, and the percentage proportions of the year's coastal total attributable to each Sect

Sector	Cwt	% increase relative to 1955	% of coastal Total
Moray Firth . .	707,090	9·7	37·3
East Coast Bight .	452,952	56·1	23·8
South East Coast .	192,549	29·9	10·2
Shetland . .	111,560	9·1	5·9
West Coast . .	430,349	25·1	22·7

Development of the fishery continued on both east and west coasts, but the east coast remained principal centre of landings and accounted for 77% of the total.

The extensive increase in production along the East Coast Bight is related to increased use of Aberdeen ı seine-net port, whereby the district landings and value rose to 278,352 cwt and £677,739, or approx-ıtely twice the respective totals for 1955. The year also recorded continued recovery of the Peterhead ery and the maintenance of good supplies at Arbroath. The outstanding development in the south-t coast fishery was the increase in landings by stranger vessels at Eyemouth whereby the total for t district rose from 57,984 cwt to 108,666 cwt.

From 1955 to 1957 catches landed at Lossiemouth and Macduff tended to decline in number but ıough this was accompanied by a fall in production in both districts, the value of the Lossiemouth ery showed a continued rise. At Buckie, on the other hand, stranger vessels helped to advance the ortance of that district as a seine-net centre and the total of 176,202 cwt landed in 1957 was exceeded y by Aberdeen. Elsewhere in the Moray Firth the fisheries were well maintained and, for the Sector ı whole, total yield increased by 9%. Moray Firth crews also continued to play a leading part in development of the west coast, where progress was most apparent in Loch Broom and Oban Districts. the former landings reached 149,399 cwt in 1957, or 46% more than in 1955. The total exceeded se of other West Coast Districts, but was followed closely by Oban where the weight of 133,671 cwt 72% greater than two years previously.

SUMMARY

A brief account is given of the regulations pertaining to the Scottish seine-net fishery.

The circumstances relating to the introduction of the fishery to Scotland in 1921 and its establishment re the war over an extensive part of the coast are reviewed.

War-time conditions, while affecting the prosecution of most branches of the fishing industry, were urable to the continued development of seining; the fishery was thus not only maintained at pre-war res, but increased in importance at ports where it had previously constituted only a minor source of te-fish supply.

The extensive developments which took place during the first post-war decade are also discussed. success experienced during the war, together with financial aid from Government sources for the uisition of new and more powerfully equipped vessels, encouraged more fishermen to participate in fishery; its importance, therefore, increased significantly at the existing centres, and extended to centres, particularly on the west coast.

The main features of the seine-net are given, and the factors governing its successful operation dis-ed. The annual course of the fishery along different Sectors of the coast is thereafter reviewed.

The development of the fishery at the Fishery Districts and ports constituting the Sectors is considered ppendix 1.

About twenty-five white-fish species are landed in Scotland by boats using the seine-net, of which principal are cod, haddock, whiting, hake, plaice and lemon sole. A brief account of the relative ortance of the principal species to the fishery as a whole is given, and the annual course of their ective landings examined. The relationship of these species to the Sector and District Fisheries is reviewed.

mprovement in the methods of collection of seine-net statistics made it possible to relate the dis-ıtion of the fishery in 1954 and 1955 to nine Fishing Areas, of which five are located in the North one off the North-west of Scotland, and three off the west coast. The importance of these Areas ive to fishing effort and production, both total and of the principal species, is considered.

The grounds of the Fishing Areas operated by the District fishing fleets are defined and the importance ıe Areas to the various marketing centres assessed.

The factors governing the seasonal composition and distribution of the fishery are seasonal changes ıe abundance of species and in fishing effort. These factors are considered in relation to the seasonal ibution of Scottish landings during 1954 and 1955. Having regard, however, to varying conditions

in the seasonal composition of fish stocks throughout the seine-net fishing field, the Area Fisheries do follow precisely the pattern pertaining to the fishery as a whole, and the conditions within the Areas considered.

Examination is made, in comparison with other fishing methods, of the increasingly important r played by the seine-net in Scottish fisheries, while the impact of its development on the landings different species from Scottish waters is considered in association with events in the trawling section the industry.

A short note on the production of the fishery in the years 1956 and 1957 is also given.

REFERENCES

Bowman, A. 1928. 'Danish seine-net fishing in the Moray Firth.' Sci. Invest. Fish. Scot., 1928, No.. 2, 37

Dickson, W. 1959. 'The use of the Danish seine net.' *Kristjonsson, H. ed. Modern Fishing Gear of the Wo* London, Fishing News (Books) Ltd., pp. 375-387.

Ellis, R. W. and Jones, R. 1956. 'The whiting, *Gadus merlangus* L., in the North Sea.' Mar. Res. Scot., 19 No. 2, 25 pp.

Glanville, A. 1953. 'Danish seining.' F.A.O. Fish. Bull., **6**, 63-87.

Graham, M. 1954. 'Trials of mesh selection in trawls and seines.' J. Cons. int. Explor. Mer, **20**, 62-71.

Hickling, C. F. 1935. *The Hake and the Hake Fishery* (Buckland Lectures, 1934). London, Arnold. 142 pp

Lucas, C. E., Ritchie, A., Parrish, B. B. and Pope, J. A. 1954. 'Mesh selection in the roundfish sei J. Cons. int. Explor. Mer, **20**, 35-50.

Rae, B. B. 1939. 'Factors in the growth of lemon soles.' Sci. Invest. Fish. Scot., 1939, No. 3, 18 pp.

APPENDIX I

DISTRICT FISHERIES (see Fig. 8)

Moray Firth

Table XIV shows for each fishing centre of the Moray Firth Sector the relationship of each year's :hes, landings and values to the respective annual averages for the periods 1935 to 1938 and 1946 955. Macduff District has two centres, the port of Macduff itself and Whitehills, while Wick District three, Thurso-Scrabster, Wick and Lybster.

Similar tables are used in the consideration of the District fisheries at other Sectors, except Shetland :h was considered earlier in the report (p. 15).

Long before the recent war the majority of Lossiemouth District fishermen had forsaken their litional calling as herring fishermen and were occupied with seining. The pioneer development of port of Lossiemouth as the principal centre along the Scottish coast attracted a large proportion of Sector landings to that District. An average of 68 vessels operated each month, several of which lertook extended trips, and from 1935 to 1938 their landings per 100 catches averaged 840 cwt, an standing unit yield at the time; as a result the district was responsible for 37% of the catches landed he Sector and 56% of the total yield.

Farther along the south coast of the firth herring remained the principal occupation of Buckie and serburgh fishermen and seining was conducted on a relatively small scale, chiefly between seasons he pelagic fishery.

In Macduff District, Gardenstown fishermen continued in their traditional calling as herring fishers. ir colleagues from Macduff and Whitehills, however, rapidly adopted the seine net method on its oduction to Scotland, and have maintained a successful fishery ever since. Before the war it was omary for a number of Macduff crews to transfer periodically to herring, while units from both s fished by seine for varying periods at other parts of the coast. Despite this seining from both ports inued on an intensive scale all the year round. The Whitehills fleet, consisting mainly of boats under t in length, covered a more restricted field than that of Macduff, and, although it usually landed more hes annually, total production was considerably less. It is noteworthy also, that, while the combined vals at both ports approached the Lossiemouth total, their weight was only approximately one-rter.

On the north coast of the firth seining is a more recent development, but even before 1939 it had med considerable importance to the Districts located there.

From 1935 to 1938 the Wick fishery attained an average annual production of 22,250 cwt from 1 catches, of which 62% was in respect of the port of Wick itself, 16% Thurso-Scrabster and 22% ster. At Wick a fleet of twenty vessels had been acquired for the specific purpose of seining, while ings were supplemented by frequent visits by stranger vessels. At Thurso-Scrabster on the other d, the fishery showed little prospect of extensive development. Although the Lybster contribution also a small one, the fishery was nevertheless important as the main source of revenue to fishermen lent there. Prior to the introduction of seining, fishermen at Wick had been occupied mainly on herring ng, while at Helmsdale small and hand-lining was the main source of fishery revenue. In 1938 the r owned a fleet of twenty-two vessels, the majority of which fished from the port itself and produced e-quarters of the District landings. Fishing was also conducted on a small scale at the creeks of o, Golspie, Brora and Dunbeath, while occasional landings were made at Portmahomack. The rict landings formed approximately one-fifth of the Lossiemouth average.

The general course of the Sector fishery as outlined from 1935 to 1938 is characteristic of a number he fishing centres, particularly Lossiemouth, Macduff, Whitehills, Helmsdale and Lybster, whereby arp rise in production in the first three years was followed by a decline in 1938. Thus, primarily he result of more fish being available on the grounds, unit landings at Lossiemouth increased from cwt in 1935 to 1,065 cwt in 1937, and this, together with increased fishing activity, advanced total

MAP OF SCOTLAND SHOWING
FISHERY DISTRICTS AND
PORTS MENTIONED IN THE TEXT
WICK
Scrabster
Thurso
Wick
WICK
Lybster
Dunbeath
Helmsdale
Brora
Golspie
Embo
Portmahomack
HELMSDALE
LOSSIEMOUTH
BUCKIE
MACDUFF
FRASERBURGH
PETERHEAD
Lossiemouth
Buckie
Whitehills
Macduff
Gardenstown
Fraserburgh
Peterhead
Aberdeen
ABERDEEN
Stonehaven
Gourdon
Johnshaven
Montrose
ARBROATH
Arbroath
Dundee
ANSTRUTHER
Anstruther
Pittenweem
May Island
LEITH
Newhaven
Leith
Port Seton
EYEMOUTH
Eyemouth
Lerwick
SHETLAND
Stornoway
STORNOWAY
LOCH BROOM
Ullapool
Gairloch
KYLE
Kyle of Lochalsh
Mallaig
Barra
OBAN
Oban
TARBERT
Ardrishaig
Portincaple
R. Clyde
Tarbert
Greenock
Largs
Rothesay
CAMPBELTOWN
Campbeltown
Ayr
AYR
Girvan
Stranraer
Port Patrick
Drummore
Luce Bay

Fig. 8

ings by 92% to 147,772 cwt. The associated increase in value however, was only 40%. On the r hand, although the decrease experienced in 1938 was in the region of 30%, higher demand countered apparent fall in prosperity, and the total value of £128,151 for the year was slightly above that for ".

Similar factors operated at Macduff and Whitehills, but by fishing further out to sea, the former 's came into closer contact with the extensive round-fish shoals present in the Moray Firth in 1937, reby landings showed a much greater increase than at Whitehills.

n years of abundance the Helmsdale and Lybster grounds are a source of profitable supply, and in landings advanced to 3·5 times and 2·5 times the respective 1935 totals; the decline in 1938, however, considerable in each case.

At Fraserburgh, only a few small boats were employed permanently at seining before the war; there, also at Buckie, the effort applied in any year was determined to a considerable extent by conditions ie herring fishing. In the four years, therefore, catches varied widely in number, and were 1,905 in irst year as against 987 in 1937. This was probably the major factor determining changes in annual uction, particularly as in lemon sole, the prime objective of the fishery, the numerical strength of ial populations is subject to less violent fluctuation than in round-fish.

At Wick frequency of landing by stranger vessels was the main factor determining variation in annual l.

No significant change is recorded in the productivity of the Lossiemouth fishery in 1939, but, in tion to man-power, the District was soon called on to contribute an important section of its fleet to services: meanwhile at Helmsdale man-power difficulties also developed rapidly. For the period as ole, therefore, the prosecution of the fishery from both Districts was severely curtailed and the age numbers of catches landed annually were 35% and 44% below the respective pre-war levels; sequent decline of 19% and 38% was recorded in annual yield. Despite this, however, Lossiemouth itained its position as the leading seine-net centre; its catches averaging 8,148 per year and landings 53 cwt were 30% and 42% of the respective Sector totals.

Throughout the war the fishery was prosecuted with consistent regularity at Macduff and Whitehills although an annual fall of 14% occurred in the catches landed at the latter port, the revised regula- for the marketing of fish were helpful in increasing total production by 50%. Smaller participation e summer herring fishing by the Macduff fleet was effective in increasing the frequency of seine-net ngs by 10%, and their weight by 83%.

More fish were also landed at Wick and Lybster but little change took place at Thurso-Scrabster and uckie, except that the latter became the base of operations of a number of foreign vessels, which took e in Britain during the war. At Fraserburgh, on the other hand, restrictions in the herring fishing so favourable to seining that the curve of annual total yield was marked by an almost uninterrupted t from 4,159 cwt in 1939 to 37,138 cwt in 1945. The average for the seven years was 19,979 cwt 1945 catches.

ossiemouth continued to record a greater catch and higher revenue than any other centre during year after the war, except in 1951 and 1952 when landings were highest at Aberdeen. With its sive fleet, numbering 107 vessels in 1955, the District also played a leading part in opening up other es to seine-net fishing, particularly on the west coast. Largely as the result of this, fewer catches brought annually to the district ports, but the greater power applied to fishing by individual vessels d to increase unit production from the pre-war average of 840 cwt to 1,449 cwt in 1946 to 1955; average yield rose by 15%.

With ninety-five vessels becoming available for fishing in 1946 landings exceeded the previous year's by almost 38%, and in 1947 they went up to 150,313 cwt, valued at £323,185. On account of a ing out of the shoals in the Moray Firth in the next two years, however, more fishermen than went to the west coast and other centres, and fewer catches were landed locally; production thus y more than one half and value by 39%. Fortunately, improved results in the next two years checked ecline.

Better market conditions in 1952 and improved fish supply encouraged a renewal of greater activity e local ports and from then onwards annual catches continued on the increase and in 1955 a post-

war maximum of 10,486 was reached; of the total Lossiemouth itself accounted for over 98%. In year landings reached 167,282 cwt valued at £462,724, and while the weight was only 13% above pre-war peak of 1937 the value was more than three times greater.

No immediate development took place at Buckie after the war, but in 1946 the small fleet then avail landed 763 catches and 19,530 cwt. The port of Buckie itself later became the base of an efficient up-to-date fleet, and from 1947 to 1949 production increased two and a half times. From 1950 to 1 however, it proved more convenient for a number of crews to land their catches at other ports and District yield fell by 50%. A return to more favourable conditions in 1953 increased productio 46,914 cwt, and better landing and transport facilities in the next two years encouraged greater use o port by both local and stranger vessels; accordingly in 1955 catches increased to 5,490 to yield 139 cwt valued at £347,504.

Although the application of greater size and power has become a characteristic feature of the post- development in fleets, limited market and navigational facilities continue to play a restrictive pa the size and number of boats employed at the smaller ports. New boats have been acquired at Mac District but small boats remain the chief components of the fleet. The fishery, which absorbs al entirely the activities of Macduff and Whitehills fishermen, is still conducted on lines similar to t prevailing before the war.

The fleets available at each port in 1946 numbered twenty-six boats but increased later as fur additions were made. A number of crews fish regularly from other ports, particularly on the west coast, operations locally are maintained at a consistently high level, whereby in the ten years more cat were landed annually than at any other District in the Moray Firth Sector. As will be observed from Table, from 1946 to 1955 each port fishery followed a course consistent with that of the Sector whole; Macduff accounted for 57% of the yearly District catches and 63% of the landings, as ag 43% and 37% for Whitehills.

Development at Fraserburgh continued on an intensive scale after the war. The employment o larger class of vessel became a prominent feature of the industry, and in later years landings were plemented by vessels from other Districts. While local grounds are an important source of supply fishery derives much of its value from operations further out to sea. The significance of these developn is demonstrated by the fact that from 1946 to 1955 the number of catches landed annually were than 2·5 times the pre-war average while the landings themselves went up to over 17 times.

In 1947 a total of 72,238 cwt was reached. This did not for long remain the maximum, howeve in 1948 a rise to 4,303 catches increased production by 55% while value went up to £224,944. was contrary to the experience of a number of ports along the coast at this time, and was due m to an unusually large fleet having operated in the early months, when fish continued to be plentiful, to more vessels than usual having continued seining in the summer because of the unsatisfactory re obtained from the herring fishing.

Production in 1949, as the result of poorer supply and fewer catches, fell by some 47%, which w have been exceeded had not prosperity continued to evade the herring fishing. However, with a re to more favourable conditions in the next three years Fraserburgh became the base of operations large number of stranger as well as local vessels. In 1952 the presence of the former increased the from twenty boats in January to forty-two later on and, while many local crews meantime shared unusually prosperous summer herring season, their replacement by the boats from other ports distinctly favourable to the maintenance of seine-net production; 3,907 catches produced 95,125 valued at £220,027.

While the majority of other Districts were favoured with progressively better results in the next years, Fraserburgh experienced a disturbing setback whereby, as was reported at the time, scarci haddock and whiting on the grounds generally fished brought the 1954 total down to 57,892 cwt, lowest since 1946. In 1955, on the other hand, the port, in association with others along the c experienced its most prosperous year. In the early months local and stranger vessels ranged in nu from 35 to 48 and reached a maximum of fifty-one in May: in the summer the fleet included fro to 27 local vessels while, as the result of the poor East Anglian fishing, more boats than usual fish the autumn and early winter months. For the year arrivals rose to 5,748, or 2,139 more than in 1

e landings and value advanced respectively by 98% and 89%—the weight, including shellfish, was 937 cwt and the value £280,155.

From 1935 to 1938 average annual landings at Wick District amounted to 22,250 cwt valued at 167; in the ten post-war years the weight increased to over 4·5 times and the value to 7·5 times. At ort of Wick replacement of old by modern vessels and the addition of new units combined to increase ower of the fleet; success of the fishery, however, continues in no small measure to depend on vessels other ports, which accounted for 35% of the port landings in 1952.

s has been indicated District development was greatly helped by events at Thurso-Scrabster where perations of an increased local and stranger fleet combined to rehabilitate the area as a centre of e fishing. On the average four times as many catches were landed as before the war, while production ased to an average of 43,925 cwt; this was 44% of the District total average as against 50% for and 6% for Lybster. At Lybster the fishery continues to be conducted on the lines prevailing before war.

t Wick sixteen local boats were employed in 1946. Meanwhile the movement initiated before the o replace old boats by modern vessels rapidly gathered momentum, and in 1948 the fleet numbered -eight. However, while replacement continued in later years, no further increase in numerical gth took place up to 1955. In 1946 boats locally owned in Thurso numbered six as against twelve 54: owing to man-power difficulties, however, only eight operated in 1955. At Scrabster the fleet de up almost entirely of vessels from Moray Firth ports.

1 1946 total catches landed at Wick numbered 3,476; they increased to 3,889 in 1949, the annual ge for the four years being 3,768. A yield of 52,763 cwt was reached in 1947; this fell by approx- ly 25% in 1949, and although the total then recorded was the lowest for the post-war period, it nevertheless nearly three times the average for 1935 to 1938.

reater concentration of stranger vessels in the next years added considerably to seine-net activity port and catches increased to an annual average of 4,832. The value of landings attained its peak 51 and, while well maintained in 1952, a gradual decline to 22% less took place in the next three .

1 1946 the weight of landings at Thurso-Scrabster was 28,847 cwt from which it rose to 51,667 cwt 48. The fishery thereafter continued to be conducted on an intensive scale, but it was not until that the 1948 total was exceeded; in that year a maximum of 3,876 catches yielded 58,714 cwt d at £143,026. Poor fishing results late in 1954, and a greater tendency for stranger vessels to y their catches to home ports, reduced yield by 7%, but the value rose to a peak of £157,174. e weight only 10% was in respect of Thurso, and it was a matter for continued concern that the bution by that port showed a further decline in 1955.

Lybster the fishery is conducted with slightly greater intensity than before the war and while ge production has increased by 24% the value has gone up by more than three times.

rly in 1946 sixteen boats became available for fishing in Helmsdale District and this increased later nty-one. Like many other centres along the coast District fishermen have taken advantage of the nce available from government sources for the acquisition of new boats, and in 1948 the fleet sed to twenty-eight vessels and in 1949 to thirty; the latter were disposed as follows:—Helmsdale 16, Golspie 6, Brora 3, and Dunbeath 5. For various reasons, however, reductions at different ies took place later, and in 1955 the number reported as mainly engaged in seining fell to only n. Fishing from the district harbours is frequently interrupted by bad weather and in recent years tions have been further handicapped by the transfer of a number of fishermen to shorework. While l catches fell in consequence by an average of 17% below the 1935 to 1938 level, little change red in the quantity of fish landed.

om 1946 to 1950 the boats brought in an average of 3,044 catches per year. In the first two years gs exceeded 20,000 cwt, but a decline of 45% followed in 1948. The latter event created a dis- unfavourable prospect for fishermen but in the next year they pursued their calling with even r effort and increased the number of catches landed to a maximum of 3,331; a substantial improve- in landings followed and this continued into 1950. After 1951, which was made difficult by extended ls of adverse weather resulting in a fall in production to a post-war minimum, fishermen experienced

three years of undoubted prosperity. In that time landings and value averaged 25,016 cwt and £64,
while the 1952 operations created a maximum of 27,037 cwt and £67,241.

This was largely the result of the productivity of the cod season, but failure to encounter that
other species in adequate quantity, together with a decline in the number of catches landed, redu
the value of the fishery in 1955 by 41%.

II. Scottish East Coast Bight

From 1935 to 1938 Peterhead was responsible for 11·2% of seine caught fish landed at East Co
Bight ports, Aberdeen 24%, Stonehaven 3·8%, and Arbroath District 61%.

The fleet employed at Peterhead District numbered twenty-five and, except for one or two from
small creek of Port Erroll, all units belonged to Peterhead itself or Boddam nearby. The fishery
usually carried on for eight to ten months of the year, and in the four years an annual average of 1,
catches produced 3,250 cwt valued at £4,745; while important to a small number of fishermen it pla
only a minor part in the economy of the District.

From Aberdeen fishing was conducted on grounds adjacent to the port and largely by crews visiti
the area for varying periods at a time; on occasion, however, landings were also made from more dist
grounds. In the above period annual value averaged £9,941.

For a long period of years fishing from Stonehaven has been conducted on a limited scale only,
in 1938 all methods produced a total value of £4,729, of which £4,170 was in respect of white-fish
£559 shell-fish. Of the white-fish landings, totalling 4,116 cwt, 57% was in respect of seining, fi
which a value of £1,654 was recorded.

In the above year a total of 63,597 cwt of white-fish was landed in Arbroath District; trawlers work
from Dundee contributed 34%, while 30% was in respect of lining and 36% seining. Gourdon was
chief lining port, and seining was the chief occupation of fishermen resident in Arbroath who accou
for more than three-quarters of the District landings from that method.

Fishing from the District ports is subject to frequent interruption by weather and from 1935 to
catches ranged in number from 3,400 to 3,885; they averaged 3,623 per year. The landings, w
averaged 17,785 cwt, were distributed to different ports as follows:

	Arbroath	Montrose	Johnshaven	Gourdon
%	77·2	4·5	·8	17·5

As at Fraserburgh reduced facilities for the prosecution of the herring fishing during the war compe
Peterhead fishermen to participate more in seining. Development was not immediate, but in 1941, w
the operating fleet was augmented after the summer herring season by large boats, motor and ste
landings reached 16,227 cwt. In 1942 the total rose to 33,611 cwt and continued near that level u
1945.

Meanwhile, by greater exploitation of fish stocks nearby and the more regular use of the port
larger boats, the fishery at Aberdeen once more assumed important dimensions: landings reac
16,491 cwt in 1941 and then increased progressively to 42,967 cwt in 1945, the latter total being six ti
the pre-war average.

Stimulated by the relaxation in the minimum landing sizes of fish (p. 3), Stonehaven fisher
likewise applied greater effort to seining and average landings increased eight times.

The numbers of the Arbroath District fleets suffered little reduction during the war but there
difficulty in maintaining adequate crews. The fishery had thus to be prosecuted on a less active s
than before, but despite this landings rose to four times the 1935 to 1938 average.

As a consequence of greater development, Peterhead and Aberdeen became responsible for a mi
higher proportion of the Sector fishery output, and over the seven years their combined totals incre
to 65% as against 30% for Arbroath and 5% for Stonehaven.

The yield from seining at Peterhead from 1946 to 1955 rapidly rose to a maximum in 1948 of 128,
cwt, valued at £244,735; yields then declined until 1953 when a minimum of 8,061 cwt was lan
Fortunately an improvement in 1954 was followed by a total of 99,757 cwt in 1955 with a value s
of the 1948 peak by only £7,700.

In 1946 landings were 68,301 cwt or 2·3 times the previous year's total. The employment of a number eam drifters and the larger class of motor boat was an important feature of operations, and the ty of these vessels to undertake extended trips contributed in no small measure to the success attained. aximum of thirteen steam-drifters and twenty-one motor boats operated between March and May while all the steam-drifters and a few motor boats turned over to herring in the summer, seining continued right on to the end of the year by a fleet ranging in number from sixteen to nineteen els.

Owing to excessive running costs the employment of steam-drifters was discontinued in 1947, but he acquisition of new motor boats the numerical strength of the fleet reached fifty-eight. In 1948, peak year, the fishery was conducted with even greater intensity and 5,479 catches were landed, a which had been unsurpassed so far. Adverse weather condition and poor supply in 1949, however, bined to reduce activity by 52%, and landings by 58%.

t would appear that despite the extended periods of success experienced at seining the preference of y Peterhead fishermen for herring fishing was always manifest, and it is not surprising that the poor ts obtained from the white-fish method in 1949 encouraged many crews to return to their traditional ng. Meanwhile several of the larger boats, which continued seining, started to land their catches at deen and elsewhere. Peterhead thus appeared to lose much of its importance as a seine-net centre, he time being at any rate, and as a result of the majority of the boats participating in the successful ner herring season of 1953 seine-net catches declined to 1,235; the yield was only 6% of the 1948 and the value 9%.

A return to conditions more favourable to seining resulted, however, in seventeen vessels fishing ore waters in 1954, while twelve small boats continued to obtain successful results on inshore grounds. ough the majority of the latter were engaged for some time at the Inverness Firth herring fishery -net catches for the year increased to 2,068 and produced 23,110 cwt. Relatively poor returns from herring fisheries together with stability in seine fish prices in 1955 encouraged still further attention e white-fish method and catches for the year went up to 4,565, or 47% more than the average for post-war decade.

From 1946 to 1955 fourteen times as much seine-net fish was landed annually at Aberdeen as before war. In the first year the port attracted a fleet of inshore and offshore vessels greater in number than before; they landed a maximum of 3,466 catches which yielded 71,360 cwt valued at £135,301. he height of fishing in 1947 the fleet numbered thirty-three inshore and sixteen offshore boats and, ough operations were frequently interrupted by bad weather, production nevertheless exceeded the ous year's total by 14%. Difficult conditions in 1948, however, brought landings down to 55,066 cwt, this was followed by a further reduction in 1949.

In recent years fewer small boats have been fishing in the vicinity of the port and landings now come ly from more distant waters. In this connection, while a fleet of modern vessels—numbering twenty- in 1955—has been acquired locally, stranger crews continue to play the leading part in maintaining h level of production. Since 1950 also, transport and marketing difficulties at other centres have ed many vessels to use Aberdeen as a landing centre, and in 1951 as many as one hundred units other Districts visited that port. Production in 1950 thus exceeded the previous year's total, and o further substantial increments it reached a maximum of 165,237 cwt in 1952, valued at £425,271. e next three years landings were maintained at an average level of 124,076 cwt per year.

o significant changes have taken place since the war in the prosecution of the fisheries from Stone- n and from Arbroath District although the acquisition of new boats at the latter centre has permitted xploitation of a wider fishing area, particularly in the summer. Rising costs in gear have induced oath fishermen to engage in lining in the early months of the year and for the same reason also a ber of Gourdon crews, who were employed in seining during the war, returned to their normal bation.

n 1946 the weight of landings at Stonehaven reached a maximum of 10,628 cwt but from 1947 to the annual average fell to 4,400 cwt. In the last two years, however, when boats encountered an ded period of successful fishing, unit production reached 765 cwt, and in 1955 the fishery attained ximum value of £17,980.

The return of fishermen from the services made it possible in 1946 for the Arbroath District fleets be more adequately manned, and in that year both catches and landings were higher than at any ti in the history of the fishery, the respective totals being 5,701 and 60,512 cwt. The value, also a maximu was £124,657.

In 1948 landings fell by 54% and, despite increased effort directed to the prosecution of the fishe yield was no greater in 1949. It was at this time, therefore, that a partial return to lining took place, a from 1950 to 1955 Gourdon and other district crews landed an annual average of 32,469 cwt by th method, the revenue produced being £88,227—43% of the district demersal total and 44% of its val

Meanwhile the majority of seine-net crews maintained or increased the effort directed to seining a in the above six years they landed an annual average of 36,314 cwt valued at £92,957—these were 48 and 46% of the respective district demersal totals.

In the ten post-war years Aberdeen District (including Stonehaven) accounted for half the Sect production, as against 28% for Peterhead and 19% for Arbroath.

III. South-East Coast

Before the war herring fishing was the principal occupation of Anstruther and Eyemouth District fishe men and little attention was directed to seining. There were indications, however, that the possibilities the method were being considered by some Eyemouth crews, and although no catches were landed in 19 the number in 1938 reached 829 yielding a total of 3,216 cwt valued at £3,741. In the four pre-war yea on the other hand, the long established fishery at Port Seton, in Leith District, maintained an average 3,009 catches per year from which was derived 86% of the total value of the Sector fisheries.

During the war herring fishing at Anstruther was well maintained until 1942 but the scarcity of herri thereafter made circumstances favourable to the white-fish methods. In the initial stages developm was slow; later, however, the combined efforts of local and stranger vessels rapidly increased producti and from 1943 to 1945 an annual average of 31,600 cwt valued at £76,408 was landed.

At Eyemouth war conditions brought the herring fishing to an early close and local fishermen turn rapidly over to seining. They landed 17,227 cwt in 1940 which was doubled in 1941, while further ann increments in the region of 10,000 cwt brought the weight and value of the rapidly developing fish to 72,595 cwt and £134,596 in 1945.

Meanwhile the vigorous Port Seton fishery was maintained while seine-net catches were also land at other ports in the District. District production in the seven years thus rose to an annual average 21,896 cwt and value to £60,013; the weight was more than twice and the value approached five tim the pre-war level.

Increased concentration on seine-net fishing by Anstruther and Eyemouth crews after the war w influenced by the continued absence of winter herring shoals in the approaches to the Firth of Fo and the failure of that fishery to revive at Eyemouth. Seining is now conducted on a greater scale at t latter centre than elsewhere in the Sector, but although it accounted for 47% of the average yield the ten years, as against 26·5% for each of the other Districts, its contribution by value was only 36 In comparison Anstruther's share was 32% and that of Leith 31%.

Although fishing continued to be prosecuted within the Firth of Forth the majority of Anstruth and Port Seton boats began to operate well seawards of May Island, and Port Seton crews opened Dunbar as a more convenient base of operations in 1948. That port developed rapidly and in 1954 thr quarters of the District catch passed through it to the distributing markets.

In 1946, the peak year of Sector production, shoals were encountered in considerable abundance all fishing grounds. Of the Sector total yield Anstruther, where between twenty-five and thirty-t local and stranger vessels prosecuted the fishery, accounted for 30%; Port Seton accounted for 15 Eyemouth fishermen were encouraged to concentrate more on seining, not only by the failure of herring fishing, but also by the success already achieved during the war by the adoption of the sein in the above year as many as thirty boats fished all the year round and produced 55% of the Sector tot

All three Districts experienced a decline in landings in 1947 and weather conditions were particula severe in curtailing the operations of the Port Seton fleet, the catches of which fell from 4,544 to 3,3 In 1948 scarcity of fish aggravated the difficulties of fishermen, and at Anstruther a reduction to 16,5

took place. A similar decline at Port Seton, which amounted to 50%, gave convincing proof of the equacy of the Firth of Forth fish population to meet the demands of increased fishing power and of need for fishermen to extend operations to a wider field.

While stranger vessels soon discontinued fishing from Anstruther, fishing activity was well maintained ocal boats working all the year round or operating between seasons of the herring fishing. In 1949 l results were obtained from distant grounds, while nearer the coast an influx of young cod helped the Anstruther and Port Seton vessels working there. An improvement thus set in at both Districts, at Port Seton, despite the previous year's results, fishermen increased their fleet to thirty vessels doubled the 1948 catch. In 1946 the Eyemouth fleet landed 4,483 catches which yielded 89,224 cwt ed at £134,714. The decline in 1948 measured 45%, while, in the next year, fishermen did not e in the return to more profitable fishing experienced at other Sector ports.

The number of boats engaged at Anstruther District ports, of which Pittenweem is the principal, s during the year particularly as some crews are engaged on herring fishing. In the four years wing 1949 they ranged from twenty-one to twenty-three, and produced an annual average of 23,549 valued at £76,229. By weight this represented 82% of the total fish, including herring, landed in District by all methods, as against 9·5% by small- and hand-line and 4·5% by great-line.

Continued advances in the efficiency of the Port Seton fleet and concentration of effort on off-shore nds maintained a high level of production, and in 1952 and 1953 both landings and value were well e the ten year averages of 30,471 cwt and £83,039.

uccess continued to attend the fisheries in the more distant waters in 1954 and 1955, and in both ruther and Leith Districts they produced better financial returns than at any other period. In the ıd year the former fleet reached a maximum strength of thirty-two vessels and, with the help of oved marketing facilities at Pittenweem, the yield attained a value of £113,437, 31% higher than ıverage for the ten post-war years. The returns from Norway lobsters, including those by boats ıg primarily for that species, increased the district fishery revenue by £42,264.

Meanwhile Newhaven, in Leith District, acquired four well-equipped new seiners. While these and district crews fished for varying periods on the west coast, the number working locally landed fish than at any other period; in 1955 a total value of £113,900 was reached, which is 14% greater the ten year average. The additional revenue from Norway lobsters was £34,709.

Operations at Eyemouth are frequently interrupted by the exposed location of the harbour, and ıes fluctuate considerably from year to year. From 1950 to 1955, however, they averaged 3,496 and ed 40,199 cwt valued at £83,472. In 1954 boats from other ports commenced to land at Eyemouth with their help landings in 1955 went up to 58,849 cwt valued at £114,979. The weight, however, hort of the 1946 peak by 34% and the value by almost 15%.

West Coast

When the Danish seine-net was first used on the west coast of Scotland a small flounder-net fishery ılready in existence in the territorial waters of the Firth of Clyde and in Luce Bay (Wigtownshire). ough the fishermen concerned readily accepted the new method, its later development in the Clyde, ılong the west coast generally, reflected largely the enterprise of east coast fishermen.

ittle or no seine-net fishing was practised before the recent war from ports and creeks bordering the n Minch, but catches were landed at irregular intervals at Mallaig and Oban further south. The size of boats then generally in use, however, tended to concentrate development in the more ered waters of the Firth of Clyde where the Districts of Tarbert, Campbeltown and Ayr became the centres of landing; between 1935 and 1938 they accounted for 94% of the coastal total.

t Tarbert herring fishing was the principal occupation of local fishermen, and seining was practised y by east coast crews who, by virtue of the size of their boats, were able to operate in the upper es of the firth; they landed their catches mostly at Rothesay.

he fishery at Campbeltown was prosecuted chiefly in the spring months according to the success herring fishing. In the above four years the fleet ranged in number from three to fourteen vessels ich only one or two were owned locally, and production, which was higher than at Tarbert, averaged cwt per year.

With its efficient harbour and marketing facilities the port of Ayr is the main fishing centre of th District. Small scale landings are also made at Largs and Greenock further north, and more extensive at Girvan, Stranraer and Portpatrick to the south. A number of boats are owned locally but these po are also visited by Newhaven and other stranger crews working on the north Irish Sea and elsewhe Drummore is the port from which fishing in Luce Bay is conducted.

The 1923 District landings at Ayr amounted to 1,026 cwt; development in the next seven ye remained comparatively slow and in 1930 the total failed to reach 5,000 cwt. Thereafter, howev additions to the local fleet and more frequent use of the District ports by stranger vessels contributed more rapid advancement, and in 1938 thirty units operated throughout February and March with smaller number later whereby 28,335 cwt were landed from 2,094 catches: they yielded a value of £31,8

During the war herring fishing occupied the interests of the majority of fishermen working from t south-west of Scotland, but seine-net activity also increased, particularly at Campbeltown and A At the former District fishermen brought in annually three times as many catches as between 1935 a 1938, giving an average of 19,541 cwt, or eight times the pre-war level. At Ayr landings in 1942 exceed 70,500 cwt, and for the seven years the average was 32,900 cwt.

At Stornoway one or two crews used the seine-net as a war-time expedient, but no such developme occurred at Oban. However, railhead facilities at Mallaig in Kyle District offered a ready means transport to market, and a fleet varying in number each year used the port as a base. In 1942 as many twenty-two vessels operated at one time, and 8,115 cwt were landed as against an average of 4,291 c for the whole period.

There has been a tendency since the war for more seine-net caught fish to be landed at Stornow and from 1946 to 1951 they averaged 698 cwt per year; further increases in the next four years culmina in 401 catches in 1955 which yielded 5,243 cwt valued at £16,077. Despite this, however, there is justification to anticipate extensive seine-net development at the port; only one or two local crews prac it in quiet periods between the herring seasons and the major landings are by mainland boats wh compelled to seek shelter in Stornoway or when they call there for stores. At Barra, at the southern en Stornoway District, one or two local crews fish intermittently during the year, transporting their cat to market via Mallaig.

In 1947 seine-net boats landed 272 cwt in Loch Broom District. Loch Clash, a creek situated south of Cape Wrath possesses a pier which, though small, is advantageously placed relative to lucrative fishing grounds of the North Minch, and it was at this centre that east coast fishermen brou seining into prominence in 1948. In that year the fleet, numbering eight boats, fished consistently fr March to December during which time their enterprise attracted buyers to the port. Development s extended to Lochinver, further south, where three to five boats worked during the late months of the ye In October also, two to three small local boats fished from Gairloch nearby, and in the year a Distr total of 665 catches yielded 18,592 cwt valued at £43,873.

Since 1948 a few boats have been acquired locally but stranger crews continue to comprise the ma components of the fleet. On account of the fish scarcity in their local waters in 1949 twenty Moray Fi crews fished regularly from Loch Clash, and District total catches increased threefold. Landings t rose steeply to 42,430 cwt valued at £116,446; although a decline of 50% followed in 1950, the organi tion of facilities for the transport of fish to central markets established the fishery on an economic b and gave promise of continued development. In fulfilment of this, increasing numbers of fishermen w attracted to the area in later years; a fleet of two dozen boats frequently fished from Loch Clash varying periods at a time and as many as seventeen from Lochinver. Meanwhile Gairloch continued contribute a little to the landings, while the greater distance of Ullapool (Loch Broom) from the fish grounds did not prevent fishermen from landing there also.

Following 1950, therefore, there was an ascending scale of production to 64,072 cwt in 1954: th in 1955, when favourable weather helped to reduce interruption of operations to a minimum, a to of 4,387 catches were landed—over one thousand more than in the previous year—and yield went up 102,300 cwt valued at £225,843.

Since the war seining has not been prosecuted from Kyle with consistent regularity, and althou 456 catches were landed in 1948 boats thereafter only made occasional visits to the port; from 1949

4 they averaged 81. There were indications, however, of renewed activity in 1955 when 4,266 cwt e landed from 218 catches.

The fishing grounds operated from Oban are some distance from the port, and under stress of weather vs may bypass them by continuing to the more sheltered waters of the Clyde or return to the east st. In favourable conditions, however, the grounds are productive of good catches while the port f offers facilities for the rapid transport of fish to central markets. It was not until some time after the however, that it was free to participate in large scale seine-net fishing, and in 1946 very few landings e made, while in the first five months of 1947 no fishing took place.

In 1948 fishing opened under favourable conditions early in January, and continued without interrup- right on to near the end of the year, during which time the fleet sometimes numbered as many as vessels; in all 68,393 cwt were landed from 1,748 catches. Operations in 1949 were less productive e, from 1950 to 1952, conditions in the fishing grounds were marked by prolonged periods of bad ther whereby, on the average, catches fell to 845 and landings to 27,935 cwt: the value was in the on of £100,000.

More favourable conditions in the next three years, however, allowed substantially increased fishing vity, and thus went far to establish the importance of seining at the port. Fishing was well maintained ughout each of these years and was marked in particular by the intensity of operations in the summer ths when the fleets frequently numbered from forty to forty-five vessels. In the three years catches aged 1,650 per year while landings ranged from 74,939 cwt in the first year to 77,828 cwt in 1955; atter gave a maximum value of £267,192.

At Tarbert herring fishing yielded a poor return in 1946, but better results followed in the next four s, and a maximum value of £269,601 was recorded in 1949. Meanwhile seining remained a secondary ent in the fishery economy of the District. It continued to be prosecuted from Rothesay, and to a r extent from Ardrishaig and Portincaple, while landings were supplemented by boats based at Oban h sometimes brought their fish to the Crinan Canal for transport to market. From all these sources ever, average annual total production in the above five years was limited to 888 catches and 4,864 the value was £11,951.

After 1950 a marked change took place in the relative importance of the district herring and seine- isheries. The former entered a period of progressively declining production, particularly from 1953 55 when its average value fell to £19,500 per year. This compelled more local fishermen to turn their tion to seining, for the time being at any rate, and in 1954 and 1955 catches and landings averaged ctively 2,199 and 15,982 cwt while value went up to approximately £47,500.

Elsewhere in the Clyde area seine-net fishing is prosecuted with varying intensity during the year, the early months generally constitute the main season. It now employs an increased number of men at Campbeltown, and a total of twenty-five vessels operating between January and April is rally representative of the numerical strength of the fleet throughout the post-war period. In 1946 1947 landings attained a relatively high average of 32,399 cwt per year, but reduced supplies in the seven years reduced the average by 26%. Improved conditions on the fishing grounds in 1955, ver, yielded better results, and boats landed a total of 29,212 cwt which produced a maximum value 56,158.

eine-net caught fish continue to be landed at all the ports of Ayr District, usually in greater quantity before the war, while at Drummore from 2,000 cwt to 2,500 cwt are brought in annually from Bay. Ayr itself continues as the principal centre, and annual changes in District production are y related to the extent that port is used as a base by stranger vessels. At the height of the season the frequently numbers thirty to over forty vessels, but in 1955 the seasonal maximum was seventy-five. n the average in the post-war period more than twice as many catches were landed in the District m 1935 to 1938 while annual yield went up to nearly three times and the value eight times. Landings above the period average in only three years between 1946 and 1953. The better fishing results in ext two years, however, and the greater concentration of fishing effort on the district ports, increased umber of catches landed in 1955 to 5,893; they produced a maximum yield and value of 109,384 nd £270,063.

APPENDIX II

TABLE I

Weights and Values of Demersal fish landed in Scotland by British Seine-net Vessels.
Years 1921 to 1955

Year	cwt	£s
1921	15,200	38,084
22	49,725	114,120
23	61,532	142,888
24	87,134	176,169
25	54,013	108,802
26	66,054	117,068
27	72,431	121,292
28	96,368	163,187
29	86,843	156,273
30	78,015	124,667
31	103,928	138,343
32	141,640	188,712
33	159,726	189,806
34	203,778	268,123
35	183,220	267,949
36	245,600	296,082
37	323,908	319,374
38	259,159	347,828
39	228,867	348,977
40	277,647	709,817
41	389,772	1,432,145
42	521,561	1,386,153
43	477,549	1,259,999
44	506,564	1,318,283
45	587,359	1,430,319
46	910,087	1,915,456
47	1,056,124	2,173,469
48	894,472	2,097,963
49	787,397	1,930,755
50	809,911	2,003,574
51	856,480	2,472,610
52	952,184	2,680,049
53	1,120,122	2,749,555
54	1,197,956	3,249,578
55	1,529,562	3,791,323

TABLE II

(a) Sector Arrivals, Landings and Landings per 100 arrivals—years 1935 to 1955.
(b) Relationship of (a) to respective annual averages for the twenty-one years.

Year	Moray Firth			East Coast Bight			South East Coast			Shetland			West Coast		
	arrivals	cwt	cwt per 100 arrivals	arrivals	cwt	cwt per 100 arrivals	arrivals	cwt	cwt per 100 arrivals	arrivals	cwt	cwt per 100 arrivals	arrivals	cwt	cwt per 100 arrivals
1935 (a)	33,847	139,249	411	5,781	19,222	333	3,451	9,698	281	173	446	258	2,299	14,718	641
(b)	1·05	·44	·42	·61	·15	·25	·39	·12	·30	·07	·01	·17	·30	·13	·44
36 (a)	33,145	186,652	563	6,768	32,881	485	3,011	9,714	322	131	395	302	20,46	15,945	779
(b)	1·03	·59	·57	·71	·25	·36	·34	·12	·34	·05	·01	·20	·27	·14	·54
37 (a)	35,599	258,920	748	7,235	33,504	463	3,489	11,807	338	104	415	399	1,740	19,347	1,112
(b)	1·10	·81	·76	·76	·26	·34	·40	·14	·36	·04	·01	·27	·23	·17	·77
38 (a)	34,250	176,202	514	8,191	31,066	379	3,756	13,247	353	141	629	446	3,236	38,037	1,175
(b)	1·06	·55	·52	·88	·25	·28	·43	·16	·37	·06	·02	·30	·42	·34	·81
39 (a)	30,478	150,998	495	6,770	29,611	437	4,322	18,496	428	213	989	464	2,910	28,802	989
(b)	·94	·48	·50	·71	·23	·32	·49	·22	·45	·09	·03	·31	·38	·26	·68
40 (a)	28,743	154,751	538	7,338	44,209	602	7,205	38,409	533	649	3,946	608	3,754	37,392	996
(b)	·89	·49	·55	·77	·34	·44	·82	·46	·56	·27	·11	·41	·49	·34	·69
41 (a)	28,522	197,182	512	9,254	79,272	857	11,497	69,348	603	600	3,455	576	4,752	53,692	1,130
(b)	·85	·62	·52	·97	·61	·63	1·31	·84	·64	·24	·10	·39	·62	·48	·78
42 (a)	26,478	232,758	879	10,072	108,640	1,078	11,000	74,374	676	713	4,370	613	6,716	109,314	1,627
(b)	·82	·73	·89	1·06	·84	·80	1·25	·90	·72	·29	·12	·41	·87	·98	1·13
43 (a)	25,281	193,235	764	10,446	102,459	981	13,574	116,356	857	1,607	12,696	790	6,397	68,159	1,064
(b)	·78	·61	·77	1·10	·79	·72	1·55	1·40	·91	·66	·35	·53	·83	·61	·74
44 (a)	24,772	230,767	952	9,914	90,506	912	12,906	120,853	936	2,394	19,411	811	5,250	62,468	1,189
(b)	·77	·73	·95	1·03	·70	·67	1·47	1·46	·99	·99	·54	·55	·68	·56	·82
45 (a)	25,302	273,800	1,082	9,967	106,380	1,067	12,280	121,512	989	2,525	32,648	1,293	4,863	57,605	1,185
(b)	·79	·86	1·10	1·04	·82	·79	1·40	1·47	1·05	1·03	·90	·87	·63	·52	·82
46 (a)	30,257	394,592	1,304	13,403	210,801	1,572	12,722	162,653	1,278	3,514	43,533	1,239	5,896	98,990	1,679
(b)	·94	1·24	1·32	1·40	1·63	1·16	1·45	1·96	1·36	1·43	1·20	·84	·77	·89	1·16
47 (a)	34,650	486,101	1,402	12,984	222,304	1,712	11,119	136,918	1,231	3,660	50,253	1,373	7,774	162,883	2,095
(b)	1·08	1·53	1·42	1·36	1·72	1·26	1·27	1·65	1·30	1·49	1·38	·92	1·01	1·47	1·45
48 (a)	31,307	399,194	1,275	12,714	215,189	1,692	8,424	78,114	927	4,310	48,901	1,304	8,202	154,937	1,889
(b)	·97	1·26	1·29	1·33	1·66	1·25	·96	·94	·98	1·76	1·34	·88	1·07	1·39	1·31
49 (a)	27,730	337,588	1,217	12,189	140,174	1,150	9,428	96,062	1,019	4,896	51,396	1,153	9,989	162,177	1,624
(b)	·86	1·06	1·23	1·30	1·08	·85	1·07	1·16	1·08	2·00	1·42	·78	1·30	1·47	1·13
50 (a)	32,096	392,456	1,222	11,431	167,152	1,462	10,240	95,112	928	4,197	51,927	1,237	10,174	151,214	1,485
(b)	·99	1·24	1·23	1·20	1·29	1·08	1·17	1·15	·98	1·71	1·43	·84	1·32	1·36	1·03
51 (a)	32,252	410,621	1,273	10,175	220,664	2,168	8,198	78,189	954	4,125	67,162	1,628	8,895	130,999	1,472
(b)	1·00	1·29	1·29	1·06	1·71	1·00	·93	·94	1·01	1·68	1·85	1·10	1·16	1·18	1·02
52 (a)	35,481	439,506	1,239	8,699	207,098	2,381	8,626	88,851	1,030	4,470	74,298	1,662	9,733	142,943	1,470
(b)	1·10	1·38	1·26	·91	1·60	1·76	·98	1·09	1·09	1·83	2·05	1·12	1·27	1·29	1·02
53 (a)	39,485	437,241	1,107	7,998	194,070	2,426	10,062	120,349	1,196	4,058	81,253	2,002	13,076	228,308	1,746
(b)	1·22	1·37	1·12	·84	1·50	1·79	1·15	1·45	1·27	1·65	2·24	1·35	1·70	2·05	1·21
54 (a)	41,875	536,708	1,277	8,027	170,215	2,121	8,027	130,554	2,121	4,512	111,485	2,471	12,684	248,712	1,961
(b)	1·30	1·69	1·30	·84	1·31	1·57	·92	1·47	2·25	1·84	3·07	1·67	1·65	2·24	1·57
55 (a)	45,325	644,612	1,422	11,083	290,195	2,618	11,083	148,218	2,618	4,438	102,278	2,304	18,060	344,004	1,905
(b)	1·41	2·03	1·44	1·16	2·24	1·93	1·26	1·79	2·78	1·81	2·82	1·16	2·35	3·10	1·32

TABLE III

Relative importance of Principal Species
to Scottish Seine-net Fishery
during years 1935-1938, 1946-1950, 1951-1955

(1) Average landings (cwt) per year.
(2) Percentage proportion of (1) to total for all species.
(3) Average annual landings (cwt) per 100 arrivals.
(4) Average values (£) per year.
(5) Percentage proportion of (4) to total for all species.

Years		Cod	Haddock	Whiting	Hake	Plaice	Lemon Sole
1935-1938	(1) cwt	47,858	76,922	43,327	7,444	46,216	15,672
	(2) %	19·5	32·9	13·8	3·0	18·7	6·7
	(3) cwt	101	171	72	16	97	35
	(4) £	38,370	56,851	20,614	15,259	83,225	63,100
	(5) %	13·6	20·5	7·3	5·0	29·0	22·2
1946-1950	(1) cwt	139,358	330,501	244,591	30,531	65,417	12,330
	(2) %	15·6	37·1	27·4	3·4	7·5	1·3
	(3) cwt	209	496	367	46	101	18
	(4) £	260,785	717,207	406,153	124,936	317,911	65,253
	(5) %	12·9	35·4	20·6	6·2	15·7	3·2
1951-1955	(1) cwt	192,085	366,603	338,883	36,294	71,754	22,389
	(2) %	17·0	32·4	29·9	3·2	6·3	2·0
	(3) cwt	259	495	457	49	97	31
	(4) £	485,926	943,140	560,246	219,751	377,477	170,404
	(5) %	16·8	31·2	18·5	7·3	12·5	5·6

TABLE IV

Sector Landings of Principal Species, Years 1935-1938, 1946-1950, 1951-1955.

(1) Average landings per year.
(2) Percentage proportion of (1) to total for all Sectors.
(3) Percentage proportion of value to total for all species.

Sector	Years	Cod			Haddock			Whiting			Hake			Plaice			Lemon Sole		
		(1) cwt	(2) (%)	(3) (%)	(1) cwt	(2) (%)	(3) (%)	(1) cwt	(2) (%)	(3) (%)	(1) cwt	(2) (%)	(3) (%)	(1) cwt	(2) (%)	(3) (%)	(1) cwt	(2) (%)	(3) (%)
Moray Firth	1935-1938	39,202	(81·9)	(83·2)	70,707	(91·9)	(90·4)	28,611	(66·0)	(60·4)	5,746	(77·4)	(75·6)	22,824	(49·9)	(59·0)	14,353	(91·6)	(93·3)
	1946-1950	74,985	(53·8)	(54·1)	175,200	(53·0)	(53·5)	61,664	(25·2)	(26·8)	8,981	(29·4)	(29·0)	29,149	(44·6)	(51·0)	10,433	(84·6)	(84·3)
	1951-1955	114,498	(59·6)	(60·8)	176,246	(48·1)	(50·1)	105,462	(31·1)	(30·0)	8,153	(22·5)	(24·4)	31,610	(44·1)	(48·9)	13,363	(59·7)	(63·9)
East Coast Bight	1935-1938	1,508	(3·2)	(3·3)	4,842	(6·3)	(7·0)	3,176	(7·3)	(6·4)	—	—	—	15,665	(33·9)	(25·6)	1,015	(6·0)	(5·2)
	1946-1950	16,151	(11·6)	(11·1)	67,424	(20·4)	(19·1)	67,763	(27·7)	(23·4)	1,131	(3·7)	(3·6)	21,901	(33·5)	(34·0)	713	(5·8)	(6·1)
	1951-1955	16,706	(8·7)	(8·6)	51,733	(16·1)	(14·9)	87,029	(25·7)	(25·7)	1,814	(5·0)	(3·4)	23,336	(32·5)	(28·9)	5,149	(23·1)	(21·4)
South-East Coast	1935-1938	4,469	(9·4)	(9·3)	445	(·5)	(·8)	148	(6·1)	(·5)	—	—	—	4,394	(9·5)	(8·9)	258	(1·6)	(·2)
	1946-1950	32,691	(23·4)	(23·3)	37,083	(11·2)	(10·9)	29,604	(12·1)	(11·1)	173	(·6)	(·4)	7,057	(10·8)	(2·5)	845	(6·8)	(6·7)
	1951-1955	32,301	(16·7)	(17·4)	25,653	(7·0)	(8·5)	35,500	(10·5)	(9·1)	116	(·3)	(·2)	8,424	(11·7)	(10·3)	1,794	(8·1)	(7·3)
Shetland	1935-1938	—	—	—	4	—	(·1)	9	—	—	—	—	—	300	(·6)	(·1)	7	(·2)	(·1)
	1946-1950	624	(·5)	(·4)	30,313	(9·1)	(9·5)	15,789	(6·5)	(6·8)	101	(·4)	(·3)	1,057	(1·6)	(1·8)	11	(·1)	(·2)
	1951-1955	815	(·5)	(·4)	38,687	(10·6)	(7·4)	43,359	(12·8)	(10·0)	219	(·6)	(·3)	1,310	(1·9)	(1·7)	72	(·1)	(·2)
West Coast	1935-1938	2,679	(5·5)	(4·2)	924	(1·3)	(1·7)	11,383	(26·3)	(32·7)	1,675	(22·6)	(24·4)	3,033	(6·6)	(6·1)	29	(·6)	(·2)
	1946-1950	14,907	(10·7)	(11·1)	20,481	(6·3)	(7·0)	69,774	(28·5)	(31·9)	20,144	(65·9)	(66·7)	6,253	(9·6)	(10·7)	328	(2·7)	(2·7)
	1951-1955	27,765	(14·5)	(12·8)	66,884	(18·2)	(19·1)	67,533	(19·9)	(25·2)	25,992	(71·6)	(71·7)	7,065	(9·8)	(10·2)	2,011	(9·0)	(7·2)

TABLE V

Sector—Moray Firth

Relative importance of Principal Species to District Fisheries, Years 1935-1938, 1946-1950, 1951-1955.

(a) Average percentage contribution to total landings.
(b) Average landings (cwt) per 100 arrivals.
(c) Average percentage contribution to total value.

District (or port)	Years	Cod			Haddock			Whiting			Hake			Plaice			Lemon Sole		
		(a) %	(b) cwt	(c) %	(a) %	(b) cwt	(c) %	(a) %	(b) cwt	(c) %	(a) %	(b) cwt	(c) %	(a) %	(b) cwt	(c) %	(a) %	(b) cwt	(c) %
Fraserburgh	1935-1938	30·0	75	9·6	7·9	19	3·1	1·7	6	1·3	2·9	—	—	10·8	32	16·4	30·9	98	62·0
	1946-1950	7·7	191	6·6	42·6	1,056	44·0	34·7	862	30·4	1·8	45	3·2	·7	16	1·6	1·0	24	2·7
	1951-1955	7·9	163	8·5	27·4	566	29·0	43·8	904	27·0	1·8	37	4·3	1·5	28	4·5	2·1	43	9·1
Macduff (port)	1935-1938	28·9	95	13·8	26·5	96	15·8	11·3	36	5·0	3·4	25	1·0	8·0	25	16·5	14·0	42	40·3
	1946-1950	31·8	291	26·0	39·9	365	39·1	13·1	120	10·3	1·8	17	1·9	3·6	33	8·4	3·6	33	9·3
	1951-1955	38·7	270	32·8	28·3	197	24·0	15·7	110	6·6	1·7	11	3·3	4·7	33	9·9	5·0	35	13·8
Whitehills (port)	1935-1938	24·9	48	9·4	25·6	57	14·0	9·3	30	3·7	—	—	—	19·8	38	26·2	18·9	33	46·6
	1946-1950	28·9	158	22·1	34·2	187	31·1	17·1	94	11·6	·9	5	·3	8·2	45	17·4	5·7	31	12·6
	1951-1955	35·6	239	34·5	27·0	180	24·2	20·8	138	9·5	·5	4	1·4	7·9	53	17·1	3·0	20	7·5
Buckie	1935-1938	49·6	339	28·4	17·4	126	11·8	7·2	51	3·5	—	—	—	12·4	85	26·3	9·6	68	27·2
	1946-1950	17·5	514	13·6	49·0	1,441	46·1	13·7	403	9·9	3·4	20	3·8	7·6	224	16·1	·9	27	1·9
	1951-1955	24·3	558	23·5	38·6	885	37·5	22·6	519	14·9	1·5	34	3·5	4·0	92	9·6	1·6	37	4·1
Lossiemouth	1935-1938	21·1	166	17·0	37·3	338	28·6	20·6	163	13·1	4·6	38	8·9	10·8	85	21·1	2·4	19	8·6
	1946-1950	21·8	298	17·2	43·8	602	40·1	14·2	195	9·5	3·4	47	5·7	9·5	130	18·4	1·2	17	2·8
	1951-1955	22·1	334	19·8	34·4	522	33·9	19·9	301	11·3	2·6	39	6·3	8·3	126	14·2	1·7	27	4·5
Helmsdale	1935-1938	10·9	67	5·4	38·6	268	27·6	16·3	95	9·8	—	—	—	21·6	116	33·9	8·1	42	19·8
	1946-1950	18·2	117	13·1	39·4	255	30·7	10·2	66	6·8	·2	1	·01	20·7	134	31·9	7·1	46	13·6
	1951-1955	32·4	297	27·5	30·0	274	25·7	14·0	129	9·3	·1	1	·1	18·3	168	28·8	2·8	26	6·8
Lybster	1935-1938	11·7	47	5·2	44·8	215	27·1	15·2	64	7·2	—	—	—	7·1	44	19·0	14·7	55	38·2
	1946-1950	16·6	75	10·2	43·8	196	31·4	5·2	23	2·3	·9	4	·1	15·3	68	27·4	13·0	58	23·1
	1951-1955	19·5	122	13·1	39·9	249	30·8	14·5	91	7·9	·5	3	1·1	14·0	87	25·9	7·0	44	17·9
Wick (port)	1935-1938	13·8	69	5·7	29·3	149	13·5	7·2	33	2·7	—	—	—	9·7	37	19·2	25·9	109	52·1
	1946-1950	22·8	264	16·1	46·3	536	41·8	7·4	85	5·2	1·8	21	1·5	7·1	82	14·9	5·8	67	12·0
	1951-1955	27·7	302	22·8	35·9	390	32·6	10·9	119	6·1	1·3	14	2·5	6·9	76	16·6	5·2	57	12·9
Thurso-Scrabster (port)	1935-1938	7·5	39	2·9	41·6	203	24·2	0·4	2	·0	—	—	—	25·6	112	43·7	12·9	58	23·3
	1946-1950	12·8	183	9·4	57·1	815	52·0	1·7	24	1·2	2·0	29	2·4	10·4	145	22·1	·6	9	1·2
	1951-1955	13·8	208	11·4	61·5	947	55·3	6·4	98	3·4	1·1	17	1·5	7·4	112	16·2	2·2	33	4·9

Relative importance of Principal Species to District Fisheries, Years 1935-1938, 1946-1950, 1951-1955

(a) Average percentage contribution to total landings.
(b) Average landings (cwt) per 100 arrivals.
(c) Average percentage contribution to total value.

District (or port)	Years	Cod			Haddock			Whiting			Hake			Plaice			Lemon Sole		
		(a) %	(b) cwt	(c) %	(a) %	(b) cwt	(c) %	(a) %	(b) cwt	(c) %	(a) %	(b) cwt	(c) %	(a) %	(b) cwt	(c) %	(a) %	(b) cwt	(c) %
Peterhead	1935-1938	2·6	7	1·6	5·6	14	4·2	·8	2	·3	—	—	—	78·8	200	86·2	·4	1	·5
	1946-1950	6·3	131	6·2	33·6	714	33·5	41·4	868	31·6	—	—	—	7·5	151	16·8	·2	3	·5
	1951-1955	5·6	65	6·1	24·1	325	25·0	37·0	526	21·6	—	—	—	20·7	193	32·9	·9	12	2·6
Aberdeen	1935-1938	9·0	44	6·2	10·4	48	6·5	14·4	67	7·4	—	—	—	48·2	225	57·5	6·0	28	15·6
	1946-1950	8·9	220	7·9	36·4	844	35·6	38·5	877	29·9	—	—	—	8·7	202	21·8	·4	11	1·1
	1951-1955	7·0	353	7·1	30·9	1,563	28·3	42·5	2,219	30·6	·6	29	·6	5·6	288	14·0	2·8	142	7·8
Stonehaven	1935-1938	4·4	8	1·6	14·6	28	10·1	43·8	83	15·8	—	—	—	21·7	41	40·0	14·8	28	32·2
	1946-1950	9·0	34	6·2	30·2	151	27·4	40·4	197	26·4	—	—	—	17·5	68	36·8	1·0	4	2·2
	1951-1955	8·6	39	7·3	18·1	82	16·4	41·6	188	15·8	—	—	—	25·1	112	45·1	3·8	16	9·3
Arbroath	1935-1938	4·0	20	2·7	21·2	104	15·6	9·3	46	4·9	—	—	—	53·3	262	62·8	2·3	11	6·2
	1946-1950	12·8	98	6·9	32·5	280	26·4	12·6	109	6·9	—	—	—	31·8	251	50·0	·7	5	1·5
	1951-1955	15·6	158	11·6	20·9	215	19·3	19·7	225	9·0	—	—	—	31·9	316	45·4	3·0	30	7·1

TABLE VII

Sector—South-East Coast

Relative importance of Principal Species to District Fisheries, Years 1935-1938, 1946-1950, 1951-1955

(a) Average percentage contribution to total landings.
(b) Average landings (cwt) per 100 arrivals.
(c) Average percentage contribution to total value.

District	Years	Cod			Haddock			Whiting			Hake			Plaice			Lemon Sole		
		(a) %	(b) cwt	(c) %	(a) %	(b) cwt	(c) %	(a) %	(b) cwt	(c) %	(a) %	(b) cwt	(c) %	(a) %	(b) cwt	(c) %	(a) %	(b) cwt	(c) %
Anstruther	1935-1938	15·7	31	10·9	—	—	—	—	—	—	—	—	—	54·0	108	60·6	·5	4	1·1
	1946-1950	44·3	450	33·3	28·1	310	28·3	14·1	159	11·6	—	—	—	9·4	96	20·5	·7	7	·9
	1951-1955	41·2	365	36·0	21·4	192	22·1	12·4	117	6·8	—	—	—	11·4	99	15·6	3·1	23	5·9
Leith	1935-1938	43·9	140	28·4	—	—	—	—	—	—	—	—	—	44·1	137	60·1	1·8	6	3·1
	1946-1950	33·5	220	28·0	29·3	174	30·1	18·3	106	13·9	—	—	—	18·9	83	25·3	·1	1	·1
	1951-1955	26·7	342	25·7	25·9	335	28·5	23·5	357	13·8	—	—	—	9·4	116	14·1	1·0	14	2·2
Eyemouth	1935-1938	20·3	76	10·1	30·1	110	24·1	10·3	38	5·8	—	—	—	16·6	62	32·9	5·4	20	13·3
	1946-1950	23·7	319	21·3	30·6	492	33·1	33·9	505	28·6	—	—	—	2·5	37	7·1	1·3	21	3·6
	1951-1955	21·8	285	23·4	18·5	248	27·3	43·1	578	27·9	—	—	—	3·9	49	9·4	1·8	22	4·5

TABLE VIII

Sector—West Coast

Relative importance of Principal Species to District Fisheries, Years 1935-1938, 1946-1950, 1951-1955

(a) Average percentage contribution to total landings.
(b) Average landings (cwt) per 100 arrivals.
(c) Average percentage contribution to total value.

District	Years	Cod			Haddock			Whiting			Hake			Plaice			Lemon Sole		
		(a) %	(b) cwt	(c) %	(a) %	(b) cwt	(c) %	(a) %	(b) cwt	(c) %	(a) %	(b) cwt	(c) %	(a) %	(b) cwt	(c) %	(a) %	(b) cwt	(c) %
Loch Broom	1935-1938	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	1946-1950	12·4	251	9·2	40·0	809	41·2	3·5	71	3·1	14·3	289	25·8	5·2	105	11·9	·9	19	2·3
	1951-1955	18·1	373	15·6	44·3	912	41·3	10·4	315	7·7	5·2	107	9·9	3·2	67	8·2	2·2	46	5·8
Mallaig	1935-1938	·5	6	·2	·2	3	·1	·1	2	·1	—	—	—	32·2	343	71·6	·8	9	·2
	1946-1950	9·0	136	2·9	25·2	387	17·3	13·5	203	8·5	29·8	449	40·3	8·2	123	14·2	·8	1	·1
	1951-1955	3·3	69	1·8	21·0	437	12·1	5·9	124	2·9	38·9	582	41·0	4·2	87	6·0	·2	4	·3
Oban	1935-1938	3·5	56	2·4	60·9	986	60·6	13·9	224	8·0	3·8	61	2·6	7·4	119	12·4	·3	4	·6
	1946-1950	2·6	95	1·8	36·9	1,380	32·3	39·5	1,477	30·7	17·6	658	29·1	3·2	121	1·2	·3	11	·1
	1951-1955	3·2	123	2·4	50·0	1,907	40·7	22·2	847	14·4	19·7	752	36·4	3·5	125	5·6	·7	29	·1
Tarbert	1935-1938	15·4	38	7·3	—	—	—	—	—	—	11·3	22	9·1	64·5	126	78·6	—	—	—
	1946-1950	26·1	208	21·7	23·6	190	21·9	23·9	192	20·1	11·3	90	17·2	6·4	51	14·2	—	—	—
	1951-1955	19·8	136	14·4	33·9	232	38·5	25·1	172	18·7	6·6	45	10·5	5·5	38	9·2	—	—	—
Campbeltown	1935-1938	7·7	43	5·1	2·1	12	2·6	77·9	451	64·0	·2	1	·4	11·8	69	27·2	—	—	—
	1946-1950	16·7	214	17·0	1·3	17	1·7	63·0	806	58·3	5·5	61	10·0	1·8	25	5·3	—	—	—
	1951-1955	16·0	147	13·3	15·3	141	21·1	53·4	490	44·4	5·5	51	11·2	2·1	19	4·3	·5	6	·2
Ayr	1935-1938	14·4	141	7·2	1·8	18	2·2	54·8	552	43·5	9·6	94	19·0	14·2	14	22·8	·1	5	·1
	1946-1950	9·3	157	5·1	·9	16	·6	58·5	1,009	52·4	8·5	140	12·3	5·2	87	9·6	—	—	—
	1951-1955	13·5	217	11·5	11·0	177	13·1	50·3	815	35·0	13·1	211	30·0	3·0	48	5·2	—	—	—

TABLE IX

Distribution of Area Catches and Landings to Districts (or ports)—Years 1954-1955

Area No.	I		II		III		IV		V		VI		VII		VIII		IX	
District (or port)	catches %	landings %	catches %	landings %	catches %	landings %	catches %	landings %	catches %	landings %	catches %	landings %	catches %	landings %	catches %	landings %	catches %	landings %
Eyemouth							19·3	24·7										
Leith							18·2	22·2										
Anstruther							21·9	16·1										
Arbroath							26·9	27·1										
Aberdeen	5·1	25·6	10·7	20·2	X	X	4·7	3·6	61·9	73·1	·5	2·3	X	X				
Peterhead	X	X	27·3	25·4	X	X	8·5	6·2	35·0	24·4	X	X						
Fraserburgh	X	X	57·1	48·6	5·6	4·1	X	X	3·1	2·5	·2	·6	·2	·3				
Macduff (port)					19·0	12·7					X	X	X	X				
Whitehills (port)					13·6	9·0												
Buckie	X	X	2·7	3·1	12·2	21·8					8·6	25·6	2·0	4·6				
Lossiemouth			1·7	2·3	27·1	33·9					6·1	14·8	·2	·4				
Helmsdale					5·9	4·6												
Lybster (port)					3·4	2·3												
Wick (port)	X	X	X	X	13·0	11·3					3·3	4·3	X	X				
Thurso-Scrabster (port)	X	X									81·2	52·3	·4	·7				
Shetland	94·5	73·5																
Stornoway													9·7	5·8				
Loch Broom													87·4	87·8				
Mallaig (port)													X	X	5·1	2·6		
Oban															94·9	97·4		
Tarbert																	22·7	12·2
Campbeltown																	25·9	18·9
Ayr																	51·4	68·9

X signifies occasional landings.

TABLE X

Area Fisheries—Years 1954 and 1955

Average annual and monthly captures of principal species per 100 days absence from port.

Species	Area	Ann. Aver.		Jany.		Feby.		March		April		May		June		July		August		Sept.		Octbr.		Novbr.		Decbr.	
		1954 cwt	1955 cwt	1954 cwt	1955 cwt	1954 cwt	1955 cwt	1954 cwt	1955 cwt	1954 cwt	1955 cwt	1954 cwt	1955 cwt	1954 cwt	1955 cwt	1954 cwt	1955 cwt	1954 cwt	1955 cwt	1954 cwt	1955 cwt	1954 cwt	1955 cwt	1954 cwt	1955 cwt	1954 cwt	1955 cwt
Cod	I	27	25	20	13	52	45	23	49	28	46	34	7	144	33	22	31	17	17	9	22	8	7	4	18	11	10
	II	168	148	110	123	209	136	129	112	102	125	160	166	309	412	259	283	173	230	144	99	99	82	60	68	85	56
	III	340	272	426	344	704	641	701	552	457	237	210	176	189	155	114	64	157	76	98	110	153	247	169	241	241	344
	IV	258	232	436	262	343	234	560	352	336	513	441	254	331	242	352	179	115	145	71	138	112	119	151	195	118	197
	VI	195	163	1,081	478	346	583	265	426	70	169	80	150	85	136	168	36	57	13	70	12	103	27	147	27	223	135
	VII	437	367	952	1,106	1,252	909	950	651	147	131	694	243	105	73	155	243	131	179	229	156	227	216	439	228	144	299
	VIII	79	95	110	191	177	283	424	390	242	175	115	116	99	87	87	31	29	41	39	19	16	9	41	107	66	111
	IX	222	222	154	135	273	270	515	573	267	306	204	56	147	58	68	44	61	43	43	43	70	52	113	83	125	114
Haddock	I	1,020	1,147	1,022	846	1,221	934	895	639	444	410	444	755	677	937	1,247	1,297	1,500	1,877	1,192	1,665	1,377	1,936	1,195	1,488	722	1,092
	II	582	897	708	1,267	1,057	1,303	622	1,001	322	498	236	269	239	176	471	1,362	883	774	700	1,050	588	1,427	578	1,340	701	1,260
	III	333	377	220	161	272	146	218	92	157	125	301	341	356	414	591	583	653	764	445	637	337	514	264	250	250	247
	IV	259	268	139	213	344	175	129	97	80	48	140	119	286	369	359	268	342	262	267	258	318	286	401	489	218	547
	VI	1,146	1,477	625	747	434	498	411	355	528	437	1,158	1,326	1,285	1,809	1,823	2,200	1,314	2,038	1,431	2,071	1,346	1,623	1,172	1,264	728	1,322
	VII	807	986	482	522	370	590	258	377	776	659	231	757	1,039	1,567	1,517	1,744	861	1,702	1,144	1,400	1,404	1,473	1,141	1,046	506	805
	VIII	888	879	810	797	1,014	1,054	396	268	401	240	602	325	774	499	1,249	898	1,179	1,348	884	1,283	824	1,159	1,156	1,368	471	700
	IX	236	201	190	170	379	208	465	247	171	128	181	113	269	168	101	260	116	221	168	337	123	211	127	166	122	142
Whiting	I	969	790	785	1,845	962	1,217	1,573	1,373	884	983	550	641	467	657	662	571	825	448	728	423	901	470	1,282	426	1,563	512
	II	671	825	673	444	1,050	456	1,090	758	827	813	434	1,049	414	681	780	794	947	1,030	453	1,088	287	918	476	1,034	282	602
	III	200	278	154	46	193	32	203	125	160	132	129	189	280	541	339	508	142	453	111	376	179	284	216	293	293	228
	IV	432	471	277	96	379	55	260	238	198	197	216	151	254	268	413	583	660	650	468	674	838	690	734	507	237	418
	VI	152	145	125	104	48	45	178	211	100	49	126	52	80	104	101	139	476	191	166	294	98	101	164	154	118	231
	VII	280	276	175	213	292	179	141	175	323	361	247	429	242	154	549	263	223	246	330	247	298	237	343	509	62	203
	VIII	361	297	610	416	448	157	172	159	270	216	275	204	275	277	499	261	431	322	389	259	153	235	706	731	308	701
	IX	469	684	567	684	818	880	798	831	709	741	150	693	153	800	82	418	75	278	60	477	95	840	357	461	634	554
Hake	I	8	9	3	14	14	22	22	26	23	20	24	1	9	1	1	3	6	3	1	3	1	2	1	5	2	6
	II	21	27	2	9	4	11	11	8	18	26	21	48	28	23	37	18	38	24	19	42	28	69	8	39	2	20
	III	11	15	1	1	1	1	2	3	1	3	8	13	27	29	24	36	14	18	35	33	21	23	9	17	17	5
	IV	0.5	0.5	–	–	–	–	–	–	–	–	–	–	–	1	–	1	–	–	1	1	2	1	2	2	1	1
	VI	16	8	–	–	–	4	11	3	25	13	18	6	31	12	20	13	29	10	14	15	11	2	7	5	7	4
	VII	88	109	36	16	9	96	55	153	65	92	89	118	79	146	72	120	235	132	129	153	125	183	48	33	40	9
	VIII	304	366	20	17	159	13	27	234	340	408	341	335	177	453	213	487	429	421	442	491	353	411	170	102	46	75
	IX	88	63	37	23	48	22	36	19	31	39	41	30	133	60	318	263	198	292	122	65	39	26	37	45	13	39
Plaice	I	29	32	4	11	15	23	22	14	14	25	74	39	73	53	32	46	25	76	35	32	37	33	24	35	21	16
	II	31	17	13	3	11	3	12	3	16	6	33	8	58	55	29	39	52	44	42	41	9	25	52	5	9	7
	III	80	73	103	80	72	54	62	55	53	77	79	73	51	49	64	53	87	110	132	82	115	92	74	67	67	77
	IV	149	138	39	26	30	37	106	111	159	145	139	134	132	137	126	160	225	244	261	224	168	149	120	88	65	34
	VI	79	101	88	73	132	60	64	52	202	240	102	211	60	74	62	58	52	147	63	38	44	67	43	75	173	120
	VII	47	84	47	141	38	42	123	66	33	112	25	101	20	53	45	142	36	88	81	121	30	92	40	14	74	20
	VIII	60	52	62	38	46	54	107	92	80	93	59	59	68	53	94	45	65	63	48	44	25	32	35	30	42	35
	IX	41	33	32	19	26	16	29	26	19	29	47	40	41	43	20	32	55	24	117	81	114	47	69	51	38	40
Lemon Sole	I	2	3	–	–	–	–	1	–	3	4	5	2	–	13	1	–	3	3	2	5	4	5	1	1	–	1
	II	35	23	4	1	10	3	12	4	28	9	62	17	48	103	59	114	50	58	35	18	17	23	12	6	1	3
	III	28	27	32	30	45	37	33	58	43	50	35	31	31	27	22	23	17	18	14	14	10	12	9	7	7	30
	IV	22	22	8	4	11	5	12	12	24	16	23	38	51	38	49	43	27	30	23	24	16	18	9	12	5	5
	VI	28	14	9	33	107	23	59	15	78	46	53	14	27	15	9	11	17	8	10	8	8	5	2	3	8	6
	VII	42	50	36	95	18	48	95	58	54	48	24	45	41	69	43	53	37	64	49	56	30	45	24	6	41	3
	VIII	18	11	–	–	–	–	5	14	36	61	33	28	41	37	21	19	13	13	7	8	2	1	2	1	2	2	1

TABLE XI

Seasonal Course of Fishery
Area Fisheries—Years 1954 and 1955

Area	Season	Catches (No.) and landings (cwt)—Average per month for each season, and percentage contributions (%) to respective annual totals.								Principal Species—Landings (cwt) per month for each season.											
		Catches				Landings				Cod		Haddock		Whiting		Hake		Plaice		Lemon Sole	
		1954		1955		1954		1955		1954	1955	1954	1955	1954	1955	1954	1955	1954	1955	1954	1955
		No.	(%)	No.	(%)	cwt	(%)	cwt	(%)	cwt	cwt	cwt	cwt	cwt	cwt	cwt	cwt	cwt	cwt	cwt	cwt
I	Jan.-March	405	(25·6)	328	(21·5)	13341	(27·7)	12993	(27·8)	145	89	5801	4439	6289	8108	12	10	101	87	3	3
	April-June	275	(17·3)	357	(23·4)	7322	(14·4)	9341	(20·0)	90	54	2136	3836	3326	4317	18	19	142	131	4	2
	July-Sept.	419	(26·5)	314	(20·5)	12455	(24·3)	8769	(18·6)	103	67	7585	6327	4296	1857	21	23	168	149	6	7
	Octbr.-Decbr.	486	(30·6)	535	(34·6)	15945	(33·6)	15698	(33·6)	109	85	7234	11135	8022	3456	16	18	151	132	3	2
II	Jan.-March	251	(28·6)	616	(29·6)	6794	(27·3)	18103	(28·6)	444	963	2321	8645	2799	4156	19	68	7	1	9	3
	April-June	217	(24·5)	578	(27·7)	6565	(26·3)	18125	(28·5)	774	1653	1072	3350	2109	8188	98	313	35	3	46	43
	July-Sept.	267	(30·5)	519	(24·9)	8827	(35·5)	15227	(28·2)	792	1198	2955	7283	3125	6998	137	224	178	41	48	63
	Octbr.-Decbr.	143	(16·4)	368	(17·8)	2706	(10·9)	10908	(13·6)	150	263	1149	5289	599	3292	19	147	36	12	10	11
III	Jan.-March	3575	(30·2)	3108	(24·7)	47622	(35·9)	30791	(21·2)	22773	16897	8868	4377	6805	2262	51	66	2918	2083	1378	1381
	April-May	2383	(13·5)	1684	(13·5)	22650	(12·2)	20399	(9·3)	10110	5452	4085	5861	4229	4122	63	199	1864	1955	1334	1070
	June-Decbr.	2855	(56·3)	3346	(62·0)	29868	(51·9)	43515	(69·5)	4907	6118	12244	17348	6204	13230	524	782	2332	2565	477	625
IV	Jan.-May	1212	(36·7)	1253	(33·9)	12719	(31·0)	10377	(23·2)	5002	4435	1890	1424	3148	2043	—	—	1277	1339	346	316
	June-Decbr.	1488	(63·3)	1756	(66·1)	20127	(69·0)	24420	(76·8)	2671	3098	4900	6255	8174	9948	—	—	2692	2974	291	374
VI	Jan.-April	252	(24·4)	219	(25·3)	4855	(24·9)	4352	(16·9)	1579	1379	1607	1721	353	275	91	43	372	268	199	88
	May-Decbr.	382	(75·6)	323	(74·7)	10059	(75·1)	10673	(83·1)	580	305	7336	8178	934	747	102	42	367	479	93	38
VII	Jan.-April	330	(47·0)	500	(40·3)	5709	(41·9)	10256	(34·8)	2344	3269	1494	2783	831	1284	186	542	173	455	156	311
	May-Decbr.	266	(53·0)	373	(59·7)	5679	(58·1)	9529	(65·2)	557	818	3022	5146	824	1203	313	461	118	335	102	178
VIII	Jan.-Feb.	25	(2·5)	76	(7·2)	849	(2·3)	2975	(7·3)	61	393	385	1519	201	376	39	23	23	76	—	7
	March-June	184	(14·7)	163	(30·7)	5981	(31·8)	5091	(24·3)	515	571	2435	1179	1000	721	909	1309	252	251	128	107
	July-Sept.	315	(44·6)	332	(46·9)	12745	(50·6)	13717	(50·4)	277	203	6614	7758	2622	1864	2355	3087	397	337	76	54
	Octbr.-Decbr.	182	(18·0)	103	(15·2)	3927	(17·7)	4847	(19·0)	76	160	2037	2532	833	1179	568	511	72	76	3	3
IX	Jan.-April	1110	(53·8)	1441	(51·3)	18258	(68·7)	22632	(59·0)	3995	5768	3813	3129	8411	2380	423	376	273	351	—	—
	May-Decbr.	476	(46·2)	672	(48·7)	4195	(31·3)	7654	(41·0)	569	465	856	1467	1226	4133	808	767	334	319	—	—

TABLE XII

Years 1938 to 1955

(a) Total weights and values of demersal fish landed in Scotland by British vessels.
(b) Weights and values attributable to principal fishing methods.
(c) Percentage contributions by respective fishing methods.

Year	Totals			Seine-net		Trawl		Great-line		Small-and Hand-line	
	cwt '000	£ '000		cwt '000	£ '000	cwt '000	£ '000	cwt '000	£ '000	cwt '000	£ '000
1938	2504	2742		259	348	1896	2037	180	203	175	151
			%	(10·4)	(12·7)	(75·5)	(74·3)	(7·2)	(7·4)	(6·1)	(5·5)
1939	2190	2673		229	349	1663	1990	144	181	147	146
			%	(10·5)	(13·1)	(75·9)	(74·4)	(6·6)	(6·8)	(6·0)	(5·4)
1940	1548	3696		278	710	1042	2458	95	252	151	271
			%	(17·9)	(19·2)	(67·3)	(66·5)	(6·1)	(6·8)	(7·1)	(7·3)
1941	1376	5252		390	1432	766	3035	78	302	140	432
			%	(28·3)	(27·3)	(55·7)	(57·7)	(5·6)	(5·7)	(9·0)	(8·2)
1942	1575	4253		522	1386	876	2450	57	149	135	262
			%	(33·1)	(32·6)	(55·6)	(57·6)	(3·6)	(3·5)	(6·3)	(6·2)
1943	1543	4018		478	1260	868	2300	64	179	114	221
			%	(31·0)	(31·3)	(56·2)	(57·2)	(4·1)	(4·4)	(6·2)	(5·5)
1944	1538	4035		507	1318	819	2191	109	318	100	173
			%	(32·9)	(32·6)	(53·2)	(54·3)	(7·1)	(7·9)	(4·8)	(4·3)
1945	2109	5360		587	1430	1288	3364	128	384	85	150
			%	(27·9)	(26·7)	(61·0)	(62·7)	(6·1)	(7·2)	(3·2)	(2·8)
1946	3090	7114		910	1915	1931	4573	166	481	91	127
			%	(29·4)	(26·9)	(62·5)	(64·3)	(5·4)	(6·8)	(1·8)	(1·8)
1947	3635	8031		1056	2173	2237	5045	266	683	77	128
			%	(29·4)	(27·4)	(61·5)	(62·6)	(7·2)	(8·3)	(1·6)	(1·6)
1948	3357	8358		894	2098	2124	5273	284	889	87	146
			%	(26·6)	(25·0)	(63·3)	(63·0)	(8·5)	(10·4)	(1·2)	(1·5)
1949	3160	7639		787	1931	2005	4611	321	1014	60	87
			%	(24·9)	(25·2)	(63·5)	(60·4)	(10·1)	(13·2)	(1·1)	(1·1)
1950	2998	7543		809	2004	1806	4361	319	1024	67	151
			%	(27·0)	(26·7)	(60·2)	(57·8)	(10·6)	(13·5)	(1·8)	(1·8)
1951	2983	8785		856	2473	1777	5206	283	902	79	202
			%	(28·7)	(28·1)	(59·6)	(59·3)	(9·5)	(10·3)	(2·0)	(2·1)
1952	3091	8461		952	2680	1846	4851	209	706	96	217
			%	(30·8)	(31·6)	(59·7)	(57·3)	(6·8)	(8·3)	(2·3)	(2·6)
1953	3186	7953		1120	2750	1792	4379	179	588	94	229
			%	(35·1)	(34·5)	(56·2)	(55·1)	(5·6)	(7·4)	(3·0)	(2·9)
1954	3259	8865		1198	3250	1827	4884	156	528	78	193
			%	(36·8)	(36·7)	(56·0)	(55·1)	(4·8)	(5·9)	(2·1)	(2·2)
1955	3562	9013		1530	3791	1825	4569	127	441	93	215
			%	(43·0)	(42·1)	(51·3)	(50·7)	(3·6)	(4·8)	(1·9)	(2·3)

TABLE XIII

Years 1946-1955

(a) Total landings, by British vessels, of principal species from North Sea, and grounds to north and west of Scotland.
(b) Relationship of seine-net and trawl landings to respective totals for 1938.
(c) Percentage proportions attributable to each method.

Species		1946	1947	1948	1949	1950	1951	1952	1953	1954	1955
Cod	a) Total cwt	541,763	458,181	361,109	369,364	371,459	320,187	453,614	529,242	552,824	514,644
	b) Seine-net (times) (%)	(2·29) (24·1)	(2·54) (32·1)	(2·00) (31·8)	(2·72) (42·5)	(2·58) (39·7)	(2·06) (36·8)	(3·20) (40·4)	(3·50) (37·8)	(4·04) (41·7)	(4·00) (44·4)
	c) Trawl („) („)	(1·41) (66·9)	(0·98) (54·7)	(0·79) (52·5)	(0·68) (47·4)	(0·67) (46·2)	(0·57) (45·9)	(0·80) (45·2)	(1·02) (49·3)	(1·05) (48·8)	(0·91) (45·1)
Haddock	a) Total cwt	1,135,458	1,198,125	926,136	682,130	684,935	666,229	634,182	873,375	966,209	1,186,547
	b) Seine-net (times) (%)	(7·16) (35·0)	(8·49) (39·3)	(5·50) (32·9)	(4·07) (33·1)	(4·57) (37·0)	(3·98) (33·1)	(4·15) (36·3)	(7·19) (45·7)	(7·54) (43·3)	(10·18)(47·6)
	c) Trawl („) („)	(0·89) (63·0)	(0·87) (58·4)	(0·75) (65·5)	(0·56) (65·5)	(0·51) (60·2)	(0·53) (64·7)	(0·48) (61·0)	(0·56) (51·4)	(0·65) (54·0)	(0·74) (50·3)
Whiting	a) Total cwt	420,734	549,968	612,635	358,523	395,827	642,407	773,881	677,493	581,165	729,264
	b) Seine-net (times) (%)	(4·29) (59·5)	(4·86) (51·5)	(4·84) (46·1)	(3·34) (54·3)	(3·64) (53·6)	(5·30) (48·1)	(5·41) (40·8)	(4·99) (43·0)	(5·48) (55·4)	(7·88) (63·0)
	c) Trawl („) („)	(0·71) (40·0)	(1·11) (48·1)	(1·38) (53·4)	(0·68) (45·4)	(0·77) (46·1)	(1·39) (51·7)	(1·92) (58·9)	(1·61) (56·7)	(1·13) (44·4)	(1·12) (36·5)
Hake	a) Total cwt	42,003	87,567	73,726	102,110	102,169	82,689	81,233	60,742	50,150	59,869
	b) Seine-net (times) (%)	(1·72) (46·2)	(2·44) (31·5)	(2·60) (39·8)	(3·64) (40·2)	(3·12) (34·5)	(3·34) (45·6)	(3·53) (49·1)	(2·85) (54·8)	(2·67) (60·1)	(3·49) (65·9)
	c) Trawl („) („)	(1·05) (51·9)	(2·93) (67·3)	(2·08) (56·7)	(2·87) (56·4)	(2·92) (57·4)	(2·60) (50·0)	(1·80) (44·4)	(1·15) (38·0)	(0·85) (34·0)	(0·88) (29·4)
Plaice	a) Total cwt	119,592	90,161	77,103	88,519	81,761	83,139	84,655	94,219	97,220	101,126
	b) Seine-net (times) (%)	(1·38) (52·2)	(1·46) (73·4)	(1·40) (82·4)	(1·68) (85·7)	(1·50) (83·0)	(1·45) (78·4)	(1·49) (79·9)	(1·58) (75·7)	(1·66) (77·1)	(1·74) (77·1)
	c) Trawl („) („)	(2·67) (45·7)	(1·11) (25·2)	(0·60) (16·0)	(0·56) (12·9)	(0·63) (15·8)	(0·81) (20·0)	(0·79) (19·3)	(1·07) (12·8)	(1·04) (22·0)	(1·03) (21·4)
Lemon Sole	a) Total cwt	20,883	20,424	27,906	29,767	42,846	44,524	49,729	55,578	46,759	48,217
	b) Seine-net (times) (%)	(0·75) (54·6)	(0·54) (40·1)	(0·65) (35·4)	(0·72) (36·6)	(1·28) (45·3)	(1·42) (48·1)	(1·49) (45·2)	(1·68) (45·4)	(1·44) (46·6)	(1·63) (51·1)
	c) Trawl („) („)	(0·24) (45·5)	(0·31) (59·9)	(0·46) (64·6)	(0·45) (59·8)	(0·59) (54·7)	(0·59) (51·9)	(0·69) (54·7)	(0·77) (54·4)	(0·61) (53·1)	(0·60) (48·5)

TABLE XIV

Moray Firth Sector—District (or port) Fisheries
Years 1935 to 1938 and 1946 to 1955

District (or port)		Years 1935-1938: a) Average annual arrivals (No.) b) „ landings (cwt) c) „ „ values (£)	Yearly relationship of a) b) c) to respective annual averages 1935	1936	1937	1938	Years 1946-1955: a) Average annual arrivals (No.) b) „ „ landings (cwt) c) „ „ values (£)	Yearly relationship of a) b) c) to respective annual averages 1946	1947	1948	1949	1950	1951	1952	1953	1954	1955
Fraser-burgh	a)	1,450	1·31	1·15	·68	·86	3,584	·64	·92	1·20	·63	·83	1·03	1·09	1·07	1·01	1·60
	b)	4,659	1·36	1·28	·58	·77	80,246	·71	·90	1·40	·74	·91	1·05	1·18	·96	·72	1·42
	c)	11,346	1·29	1·22	·58	·81	178,443	·73	·83	1·26	·70	·78	1·14	1·23	·96	·83	1·56
Macduff (port)	a)	4,635	·88	1·07	1·04	1·02	5,482	·89	·91	·77	·71	·83	·95	1·17	1·23	1·22	1·31
	b)	15,431	·59	1·22	1·26	·85	43,168	1·08	1·32	·76	·90	·73	·72	·96	1·08	1·14	1·33
	c)	23,290	·75	1·27	1·02	·97	121,904	·85	·97	·61	·74	·73	1·01	1·21	1·13	1·36	1·39
Whitehills (port)	a)	5,350	1·07	1·04	·89	·99	4,141	1·01	1·06	·73	·71	·84	·95	1·01	1·28	1·15	1·25
	b)	10,383	·79	·82	1·25	1·13	25,066	1·12	1·15	·41	·55	·70	·79	1·01	1·27	1·32	1·68
	c)	19,639	·97	1·04	·95	1·04	72,466	·89	·86	·38	·51	·75	1·15	1·18	1·24	1·47	1·57
Buckie	a)	1,356	·75	1·24	1·08	·89	2,185	·35	·88	·75	·61	·61	·70	·66	·85	2·07	2·51
	b)	9,397	·96	1·18	1·22	·63	54,646	·36	·96	1·04	·86	·53	·45	·37	·86	2·00	2·56
	c)	13,949	1·23	1·07	1·03	·75	143,976	·34	·78	·97	·85	·54	·54	·43	·85	2·29	2·41
Lossie-mouth	a)	12,621	1·00	·82	1·10	1·08	8,393	1·07	1·06	·77	·71	·95	·87	1·00	1·14	1·19	1·25
	b)	105,954	·73	·90	1·43	·96	121,607	1·17	1·24	·61	·59	·71	·79	1·05	1·20	1·26	1·38
	c)	109,479	·83	·84	1·16	1·17	326,095	·99	·99	·62	·62	·68	·91	1·16	1·19	1·42	1·43
Helmsdale	a)	3,281	·90	1·07	1·07	·99	2,648	·98	1·22	1·17	1·26	1·11	·78	·86	·98	·93	·70
	b)	20,499	·48	1·20	1·63	·68	20,155	1·05	1·21	·65	1·06	·91	·66	1·34	1·27	1·11	·77
	c)	16,929	·72	1·09	1·22	·98	53,989	·93	1·11	·79	1·10	1·00	·83	1·25	1·18	1·14	·67
Lybster (port)	a)	1,093	·86	1·05	1·24	·85	1,142	·90	1·11	1·07	·92	·82	1·04	·97	1·00	1·12	1·06
	b)	4,969	·65	1·06	1·76	·53	6,172	1·05	1·08	·76	·66	·48	·75	·92	1·25	1·52	1·54
	c)	5,636	·98	1·04	1·18	·80	18,166	·97	·90	·83	·75	·63	·88	1·00	1·08	1·58	1·38
Wick (port)	a)	3,035	1·22	1·08	·80	·87	4,407	·79	·87	·88	·88	1·14	1·02	1·12	1·03	1·10	1·16
	b)	13,682	·96	·87	1·05	1·11	49,563	·89	1·06	·86	·79	1·09	1·02	1·08	1·09	1·06	1·03
	c)	24,021	1·19	1·12	·74	·96	138,426	·77	·87	·81	·78	1·16	1·26	1·24	1·03	1·08	1·00
Thurso-Scrabster (port)	a)	703	·59	·61	1·19	1·60	2,949	·62	·93	1·16	·99	·92	·96	·95	1·31	1·17	·97
	b)	3,599	·48	·40	1·16	1·96	43,925	·66	·95	1·18	·96	·70	·81	·99	1·34	1·24	1·20
	c)	6,839	·51	·48	1·53	1·48	119,638	·61	·89	1·15	·90	·77	1·01	1·11	1·20	1·31	1·10

District (or port)		Years 1935-1938					Years 1946-1955									
		a) Average annual arrivals (No.) b) " " landings (cwt) c) " " values (£)	Yearly relationship of a) b) c) to respective annual averages				a) Average annual arrivals (No.) b) " " landings (cwt) c) " " values (£)	Yearly relationship of a) b) c) to respective annual averages								
			1935	1936	1937	1938		1946	1947	1948	1949	1950	1951	1952	1953	1954	1955
Peterhead	a)	1,280	·64	·88	1·27	1·21	3,105	·91	1·36	1·76	·92	1·03	·90	·57	·39	·67	1·47
	b)	3,250	·59	1·00	1·56	·84	58,714	1·16	1·63	2·20	·92	·82	·78	·24	·14	·39	1·70
	c)	4,745	·60	·98	1·29	1·12	118,906	1·03	1·42	2·06	·96	·78	·79	·29	·18	·49	1·99
Aberdeen (port)	a)	1,495	·74	·92	1·12	1·22	2,811	1·23	1·10	·83	·96	1·12	1·12	1·07	·93	·73	·89
	b)	7,001	·71	1·01	1·24	1·03	101,919	·70	·80	·54	·46	·81	1·41	1·63	1·44	·91	1·30
	c)	9,941	·92	·99	1·11	·97	240,291	·56	·64	·53	·39	·77	1·45	1·77	1·47	1·08	1·33
Stonehaven (port)	a)	596	·77	·64	·95	1·63	970	1·47	1·26	·91	1·32	1·04	·75	·78	·76	·80	·93
	b)	1,132	·34	·32	1·25	2·08	5,028	2·11	1·15	·67	·64	·86	·51	·71	·78	1·17	1·39
	c)	1,654	·67	·54	1·07	1·70	11,585	1·53	·90	·76	·84	·97	·60	·91	·80	1·10	1·55
Arbroath	a)	3,623	·94	1·07	·93	1·06	4,143	1·38	1·07	·97	1·29	·98	·84	·76	·82	·92	·96
	b)	17,785	·57	1·25	1·03	1·05	38,239	1·58	1·04	·73	·95	·80	·73	·63	·92	1·28	1·33
	c)	19,277	·80	1·22	·92	1·05	96,086	1·29	·97	·79	1·08	·90	·94	·78	·79	1·20	1·24

TABLE XVI

South-East Coast—District Fisheries
Years 1935 to 1938 and 1946 to 1955

District		Years 1935-1938					Years 1946-1955									
		a) Average annual arrivals (No.) b) " " landings (cwt) c) " " values (£)	Yearly relationship of a) b) c) to respective annual averages				a) Average annual arrivals (No.) b) " " landings (cwt) c) " " values (£)	Yearly relationship of a) b) c) to respective annual averages								
			1935	1936	1937	1938		1946	1947	1948	1949	1950	1951	1952	1953	1954	1955
Anstruther	a)	30	·97	1·07	·93	·97	3,067	1·20	1·03	·61	·85	1·03	·77	·85	·99	1·19	1·47
	b)	59	·88	1·25	·98	·86	30,629	1·59	1·19	·54	·91	·90	·57	·71	·89	1·21	1·50
	c)	83	·90	1·24	1·04	·79	86,333	1·14	·91	·45	·78	·95	·82	·94	·94	1·37	1·83
Leith	a)	3,009	1·14	·89	1·01	·96	3,292	1·38	1·03	·84	1·00	·95	·74	·87	1·06	·96	1·15
	b)	9,614	1·00	·91	1·05	1·04	30,471	·82	·52	·39	·86	·83	·85	1·04	1·45	1·49	1·73
	c)	12,271	·90	·85	·95	1·29	83,039	·83	·46	·44	·96	·82	1·09	1·22	1·46	1·77	1·79
Eyemouth	a)	389	—	·77	1·10	2·13	3,751	1·20	1·21	1·01	·94	1·05	·90	·84	·94	·86	1·06
	b)	1,444	—	·63	1·14	2·23	53,670	1·67	1·59	·91	·78	·79	·65	·66	·91	·98	1·09
	c)	1,993	—	1·02	1·10	1·88	96,069	1·40	1·39	·85	·73	·88	·85	·84	·95	·96	1·20

TABLE XVII

West Coast Sector—District Fisheries
Years 1935 to 1938 and 1946 to 1955

District	Years 1935-1938					Years 1946-1955										
	a) Average annual arrivals (No.) b) „ „ landings (cwt) c) „ „ values (£)	Yearly relationship of a) b) c) to respective annual averages				a) Average annual arrivals (No.) b) „ „ landings (cwt) c) „ „ values (£)	Yearly relationship of a) b) c) to respective annual averages									
		1935	1936	1937	1938		1946	1947	1948	1949	1950	1951	1952	1953	1954	1955
Stornoway	a) —	—	—	—	—	147	·03	·22	·20	·19	·91	·58	1·83	1·46	1·85	2·73
	b) —	—	—	—	—	1,930	·02	·14	·14	·33	·90	·65	1·97	1·53	1·60	2·71
	c) —	—	—	—	—	5,631	·02	1·01	·13	·23	·75	·58	2·09	1·41	1·83	2·86
Loch Broom	a) —	—	—	—	—	1,898	—	·01	·35	1·09	·77	·94	1·25	1·60	1·69	2·31
	b) —	—	—	—	—	38,964	—	·01	·48	1·09	·61	·84	1·07	1·64	1·65	2·62
	c) —	—	—	—	—	93,649	—	·01	·47	1·24	·62	1·07	1·13	1·37	1·68	2·41
Kyle	a) 35	1·26	·77	·66	1·31	159	·87	1·82	2·86	1·02	·79	·31	·40	·03	·50	1·37
	b) 150	1·09	·99	·56	1·36	2,415	·65	2·71	2·33	·87	·71	·33	·59	·05	·80	1·76
	c) 462	·88	·84	·47	·95	8,987	·45	1·92	2·03	·76	·89	·39	·74	·07	1·00	1·73
Oban	a) 57	1·63	·75	·56	1·04	1,234	·01	·79	1·42	·90	·80	·51	·73	1·56	1·71	1·54
	b) 917	1·38	·54	·37	·17	46,683	·01	·95	1·47	·90	·56	·54	·70	1·61	1·61	1·67
	c) 873	1·44	·77	·34	1·45	144,397	·01	·67	1·32	·86	·51	·52	·92	1·66	1·68	1·85
Tarbert	a) 134	·90	·78	·81	1·50	1,255	·92	·82	·73	·53	·53	·51	·93	1·51	1·64	1·87
	b) 266	·90	·96	·74	1·39	8,735	·86	1·96	·50	·64	·67	·63	·71	1·35	·88	1·85
	c) 565	·78	·85	·81	1·59	23,107	·76	·55	·49	·32	·46	·90	·91	1·50	2·06	2·05
Campbeltown	a) 407	·65	·47	·76	2·09	2,250	·89	1·13	·81	·94	1·04	·96	·95	1·05	·95	1·28
	b) 2,344	·21	·14	·82	2·84	24,382	1·32	1·43	·87	·99	·98	·76	·68	·94	·82	1·20
	c) 2,581	·36	·21	·71	2·72	53,915	1·17	1·20	·73	·83	·92	1·02	·91	·99	1·00	1·21
Ayr	a) 1,709	1·04	·98	·75	1·23	3,566	·73	·80	·72	·93	1·25	·98	·78	1·02	1·14	1·65
	b) 17,438	·67	·80	·90	1·62	49,274	1·15	1·15	·71	·92	1·40	·97	·83	1·05	1·43	2·20
	c) 18,957	·75	·74	·82	1·68	156,925	·77	·75	·59	·69	1·12	1·04	·91	·93	1·44	1·75

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